

An Association of Galanin with some biochemical parameters in Iraqi Type II Diabetic Patients

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ABSTRACT

Background: The body's ability to produce insulin is affected by a group of chronic metabolic diseases known as diabetes. Someone has high blood sugar, either because the pancreas is not producing enough insulin or because the body's cells are not using insulin that is being produced effectively. Present study tried to explore whether there was any association of galanin with urea, uric acid, creatinine, albumin, globulin, total protein, albumin-to-globulin ratio, fasting glucose in patients with type 2 diabetes. **Materials and Methods:** This study included 42 patients; and 42 healthy controls (HCs); who served as a control group. Enzyme-linked immunosorbent assay (ELISA) was used to determine the level of galanin in serum. While levels of urea, uric acid, creatinine in addition fasting serum glucose (FSG) were determined by enzymatic colorimetric methods, albumin, globulin and total protein (T. protein) were estimated by colorimetric methods. **Results:** The Study found that level of serum galanin in patients with type 2 diabetes mellitus (T2DM) was higher compared to healthy subjects ($P < 0.0001$) and FSG was higher in patients compared to HCs ($P < 0.0001$). Galanin had a significant positive relationship with FSG, urea, creatinine, and globulin ($P < 0.0001$). However galanin was found to have a negative correlation with uric acid, T. protein, and albumin, in added ,albumin to globulin (ALB/GLB), $P < 0.0001$. Studied parameters found in descending order of area under receiver operating curve (AUROC): Galanin was (0.858), FSG (1), urea (0.757), uric acid (0.541), creatinine (0.507), T.Protein (0.530), globulin (0.586) and albumin (0.657). While (ALB/GLB) was (0.646). New values of cut-off value for studied variables have been estimated as follows, Galanin (> 6.14 ng/mL), FSG (> 116.5 mg/dL), Urea (> 30.5 mg/dL), Uric acid (< 4.75 mg/dL), Creatinine (> 0.835 mg/dL), T. Protein (< 7.05 g/dL), Albumin (< 4.35 g/dL), Globulins (> 2.75 g/dL) and ALB/GLB (< 1.545). **Conclusion:** Serum galanin may be used as a biomarker the detection o.

1. INTRODUCTION

Impaired insulin secretion and insulin resistance are major contributors to T2DM. Elderly and obese individuals are particularly susceptible. Some medications dietary modifications help control it. Insulin deficiency is caused by a defect in the cells of pancreas when insulin resistance is prevalent, the mass of beta cells shifts in such a way as to increase the amount of insulin produced while decreasing excessive abnormal demand. Although it is "relative" to the intensity of insulin, plasma insulin concentrations are usually higher during fasting and after an exciting meal.

Due to insulin resistance, insulin concentration in plasma is insufficient to maintain normal blood glucose levels. The complex regulation of glucose homeostasis is tightly mediated by the hormone insulin, whose secretion is closely related to its sensitivity. Also their respective contributions to pathogenesis are essentially indistinguishable from each other. Impaired glucose tolerance eventually results in insulin resistance hyperinsulinemia. It is believed that the main cause is insulin resistance [1].

A neuropeptide called galanin has 29 amino acids. A peptide that was first identified as a neuroprotective peptide in the intestine of pigs in 1983; it is mainly generated in added added central peripheral neurological

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systems as well as the digestive system. Galanin receptors 1, 2, and 3 are activated to exert an effect. It plays a crucial part in controlling energy balance and adjusting food intake [2]. This peptide is also found in various, tissues, including adipose tissue, connective tissue, skeletal, cardiac muscle, and pancreatic islet. Learning, memory, sleep, appetite, inflammation, pain threshold, sexual behaviour, parental conduct. according to recent preclinical and clinical investigations, Galanin, galanin-like peptides, alarin, and Spexin are members of the galanin polypeptide family, which may regulate glucose metabolism, treat insulin resistance, and reduce risk of T2DM. In contrast, second member of galanin family, galanin-like peptide, is made up of 60 amino acid peptides that have same homology sequence as galanin can activate the three galanin receptors [3].

Galanin concentration was linked to T2DM mellitus, according to clinical research. Galanin was also detected in increased concentrations in the plasma of patients with obesity metabolic disorders. Numerous more investigations back up the same findings. They generally demonstrate that after consuming glucose, galanin levels rise. Additionally, during a glucose tolerance test in healthy volunteers and patients with T2DM, galanin levels were positively correlated with blood glucose levels while fasting. In a previous study evaluating the relationship between serum galanin in obese children and an increased risk of obesity, it was found that serum galanin levels were significantly higher in obese children than in healthy controls. studies indicated that in obese children, galanin is associated with fat metabolism and glucose homeostasis [4]. Galanin plays an essential function in controlling energy balance and adjusting food intake. Beirut, United Nations. Animals and commentary abound. It was found that galanin increases glucose levels and affects insulin sensitivity [2]. Given in view of above, also on insulin resistance, a new concept of insulin resistance has emerged. Indicates contrast between an elevated galanin level and decreased glucose processing. Recent findings supported conjecture that a higher level of galanin was a response to the development of galanin resistance in obese T2DM subjects. Cumulative, clinical studies generally support a beneficial effect of galanin pathway activation. To improve glucose processing, an elevated level of T2DM galanin in response has been supported by development of resistant galanin in obese patients

with T2DM. There is evidence that stimulation of the galanin pathway has positive effects. Cumulative, clinical investigations largely confirm this. To improve glucose management and T2DM management [3].

Galanin has two different effects on the insulin system. Galanin suppresses insulin, according to electrophysiology research on one hand. Sensitive inhibitory regulatory protein (A) is activated in response to bacterial toxins, suppressing adenylate cyclase enzyme activity. Research has shown a good relationship between galanin excretion, and galanin levels in the blood, including the effect on insulin sensitivity, the development of insulin resistance in obese patients is the reason for a high levels of galanin [5]. Several Iraqi studies estimated the relationship of type 2 diabetes with many inflammatory variables [6, 7], However, this is the first study in Iraq to estimate the relationship of this globally widespread disease with serum levels of galanin. It should come as no surprise that the galanin system, T2DM, and osteoporosis have many bilateral interactions [8]. Zhang et al. Galanin levels were higher in T2DM patients than in the control group and lower in patients with osteoporosis. The ability of galanin to activate central GALR2 may help mitigate both disorders [9]. Although the exact mechanisms of galanin are still not fully understood, we suggest that it may have a direct or indirect influence on link between osteoporosis, T2DM. There are some strong indications linking elevated galanin levels to both disorders. Galanin, impairment of glucose metabolism, bone formation in osteoporotic patients may be caused by low levels of galanin. Research findings indicate that galanin may help T2DM osteoporosis by preventing bone loss and improving glucose insulin sensitivity. In general effect of galanin may help reduce insulin resistance and thereby reduce the incidence of osteoporosis in patients with T2DM. In other words, people with diabetes are more likely to develop osteoporosis than healthy individuals. This peptide helps regulate insulin sensitivity, fracture healing, and cartilage plate. Galanin administration helps treat T2DM osteoporosis primarily by activating central GALR2 [10].

Although treatment with insulin or galanin by itself may improve insulin added ,sensitivity it is still not known how glucose transporter 4 (GLUT4) trafficking and insulin sensitivity interacts. In this research, how well each of the reagents works together was evaluated.

compared with treatment with insulin or galanin alone given to rats with T2DM. According to the results of research, coadministration of both reagents was better than treatment. Galanin or insulin alone significantly increased glucose infusion rates in blood glucose and hyperinsulinemia tests, 2-deoxy-[3H] glucose contents, GLUT4 density and protein kinase C activity levels. However, it decreased blood glucose and insulin levels as well as contents of retinol-binding protein 4 and did not affect Glut4 (Slc2a4) mRNA expression levels in muscle cells. Comparing the administrative group with insulin or galanin groups, changes in ratios of GLUT4 immunoreactivity in plasma membranes to total cell membranes of muscle cells were more excellent greater in an administrative group, and results indicate that these two hormones work in harmony[11].

Galanin levels in blood were measured in a study to determine its utility in diagnosing stomach tumors. compared to healthy persons, serum galanin levels decreased in patients with stomach cancer. Study concluded that serum galanin levels could be used as a potential biomarker in the detection of stomach cancer [12]. Galanin has been demonstrated to serve as a regulatory peptide within ovary, controlling pre-ovulatory impulses of LH and prolactin and as well as regulating steroidogenesis in ovarian tissue. It can influence secretion and be expelled with gonadotropin-releasing hormone (GnRH). Galanin, too, modulates the activity of steroid hormones, it can sharply lower LH levels, insulin, glucose and insulin resistance and activation of the release of FSH. It might regulate hormonal, inflammatory, metabolic problems and as well as PCOS gene expression. This would imply that galanin has a future target pathway that could be exploited to treat PCOS [13]. Plasma galanin levels were significantly greater in patients with gestational diabetes GDM than in NGT, according to correlation analyses between galanin and pre-pregnancy body weight and pre-pregnancy BMI. that patients with GDM this increase is accompanied by a significant decrease in SHBG, a higher pre-pregnancy BMI. As a result, patients with GDM are most affected by pre-pregnancy BMI change regarding circulating galanin levels. Increased galanin in GDM patients may indicate a physiological improvement in glucose tolerance in GDM patients [14]. Galanin treatment can improve insulin sensitivity to lower blood sugar. Galanin resistance is the

difference between elevated circulating galanin levels in diabetic patients and decreased glucose processing, which is an important stage in diabetes mellitus. The etiology of T2DM insulin resistance and galanin resistance are related to each other. To better understand the causes of T2DM and possibly develop a new treatment plan, it is helpful to have an in-depth understanding of effects of galanin resistance. Results of previous studies are in agreement with the findings of current research, galanin may increase body weight. Galanin raises insulin sensitivity in human and rodent models. T2DM as a disorder of galanin resistance [15].

A family of globular proteins is known as globulins. While the immune system produces some globulins, the liver produces others. One of many environmental factors that may have a role in the pathogenesis of T2DM is sex hormone-binding globulin (SHBG). Epidemiology studies also show a coordinated association between T2DM and lower blood SHBG levels. Insulin levels amount of circulating SHBG are inversely correlated. By altering biological effects of sex hormones (testosterone and estrogen) on extremities Tissues (such as liver, muscle, and fat), resistance and low circulating levels of SHBG are a strong indicators of risk of developing T2DM in both women and men[16].

High blood sugar in people with diabetic ketoacidosis is known to lead to elevated indicators such as blood urea and creatinine. Diabetic kidney disease (nephropathy), stage renal failure can be delayed and diabetic kidney disease can be recognized and treated early thanks to serum urea and creatinine concentrations [17]. Elevated creatinine and urea nitrogen (BUN) are risk factors for coronary artery disease (CAD) in people with T2DM. According to a recent study, one of the factors contributing to coronary heart disease in patients with T2DM is elevated urea nitrogen and creatinine [18]. Diabetes mellitus complications such as diabetic nephropathy (DN) are characterized by a persistent, low-grade inflammatory load. Recent research has focused on inflammatory situations where indicators of inflammation, such as C-reactive protein to serum albumin (CAR) ratio, are present. T2DM and DN both have an elevated inflammatory burden. According to research, T2DM patients with diabetic nephropathy have more elevated CAR levels [19]. Hyperuricemia (HUA) and T2DM have been linked to two of the most prevalent metabolic illnesses worldwide. They could

happen simultaneously or in order. There is a link between uric acid levels, according to prior investigations. HUA was favourably correlated with central body fat distribution in T2DM patients. These results imply that central adiposity may mediated the positive relationship between HUA and insulin resistance (IR) [20]. The main objectives of this study were to measure serum levels of galanin in patients with T2DM and to discover the relationship between galanin and some different biological parameters in Iraqi patients.

2. MATERIALS AND METHODS

Eighty-six subjects were included in this study, forty-two of whom had T2DM; they were diagnosed with the disease through a FSG test after at least eight hours of fasting. Forty-two subjects were enrolled in study as HCs; They were matched by age, gender, ethnic background to T2DM patients. All respondents' ages ranged from 30-60 years. Al-Ramadi Teaching Hospital was selected for sampling between November 2022 and January 2023. The concentration of galanin in samples was determined using ELISA (Elabscience Inc, USA).

Collection and Analysis: Samples were collected from Ramadi Teaching Hospital. The blood used in this study is venous blood after eight hours of fasting. Blood was centrifuged at 1500 x g for 10 minutes to separate the serum. Serum was then stored in eppendorf tubes at 20 °C until analysis. Serum of each individual was analyzed for galanin using an ELISA kit purchased from (Elabscience/USA); Measurement was performed using an ELISA microplate reader of FSG, urea, uric acid and creatinine levels were measured for each sample by enzymatic colorimetric method. The colorimetric method was determined to measure total protein levels, albumin and globulin.

Statistics:

Statistical investigations of these results were performed with Graph Pad Prism version 7.04 (Graph Pad Software, La Jolla, CA, USA). Consequences are the mean, standard error of the mean (SEM) and standard deviation (SD). The statistical significance of the interpersonal differences was verified with a t-test. At the same time the accuracy of the investigation was measured by the area under the curve (AUC) of the receiver operating characteristic (ROC) curve. $P < 0.05$

was measured to be statistically significant. Cut off values, sensitivity and specificity were determined.

3. RESULTS AND DISCUSSION

As shown in (Table 1). Results for patients and the control group are expressed as mean and standard deviation (SD). Experimental features were standard mean life (years) is 48 years for healthy people and 50 years for patients $P > 0.1962$, according to scoring criteria given (Table 1). Results showed that patients with T2DM had significantly higher levels of serum galanin (ng/mL) compared to HCs with $P > 0.0001$. Urea estimate (mg/dL) showed a rise in patients compared to HCs, $P > 0.0001$. Well as serum FSG level (mg/dL) at least eight hours after exercise Fasting was significantly higher in patients than HCs $P > 0.0001$. Both creatinine (mg/dL) and globulin (g/dL) increased in patients compared to HCs respectively, $P = 0.7105$, $P = 0.2038$, as shown. While results showed an increase in levels of uric acid (mg/dl), total protein (g/dl), albumin (g/dl) and albumin-to-globulin ratio, these parameters gave higher levels in HCs than patients. , where uric acid was $P = 0.4162$, when protein $P = 0.2966$, albumin $P = 0.0096$, finally albumin-to-globulin ratio $P = 0.1824$, respectively.

Table 1: Comparisons of Parameters between Two Studied groups.

Parameter	Healthy Controls			T2DM Patients			p-value
	Mean	SD	SEM	Mean	SD	SEM	
Galanin ng/mL	5.234	1.545	0.2357	8.17	2.449	0.3735	<0.0001
Age year	48.21	8.399	1.281	50.35	6.74	1.028	0.1962
FSG mg/dL	92.7	8.199	1.25	167.9	39.71	6.056	<0.0001
Urea mg/dL	28.49	6.585	1.004	34.41	5.944	0.9065	<0.0001
Uric acid mg/dL	4.841	1.303	0.1987	4.655	0.7293	0.1112	0.4162
Creatinine mg/dL	0.8447	0.2103	0.03206	0.8605	0.1826	0.02785	0.7105

T. Protein	g/dL	7.03	0.3732	0.05692	6.895	0.755	0.1151	0.2966
Albumin	g/dL	4.435	0.5232	0.07979	4.177	0.3657	0.05577	0.0096
Globulins	g/dL	2.536	0.7508	0.1132	2.719	0.5603	0.08544	0.2038
ALB/GLB		1.653	0.253	0.03905	1.565	0.3381	0.05216	0.1824

A significant positive correlation was detected between galanin, FSG and urea, respectively ($r = 0.535$, $p < 0.0001$), ($r = 0.301$, $p = 0.006$). There is also a significant positive correlation between galanin, creatinine and globulin, ($r = 0.040$, $P = 0.719$), ($r = 0.053$, $P = 0.634$). In addition to the positive correlation of age ($r = 0.207$, $P = 0.063$). While results gave a significant negative correlation between galanin and uric acid ($r = -0.063$, $P = 0.572$), also a negative correlation with total protein ($r = -0.082$, $P = 0.465$), albumin ($r = -0.100$), $P = 0.374$), finally (ALB/GLB) ($r = -0.200$, $P = 0.0756$), as shown)Table 2.(

Receiver Operating Characteristic (ROC) curve analysis showed that this most effective biomarkers were suitable for the identification of patients with T2DM who reported FSG [AUC: 1, $P < 0.0001$, cut-off value: >116.5 , Sensitivity% (sen %): 100, Specificity% (spec %): 100]. Galanin has been determined to be an important biomarker for patients with T2DM [AUC: 0.858, $P < 0.0001$, Cut-off value: >6.14 , Sen %: 76.74, Spec%: 76.74, Likelihood Ratio (LHR): 3.3]. Shows urea, albumin, and ALB/GLB Good discriminatory efficacy between healthy subjects and patients with T2DM. Urea [AUC: 0.7572, $P < 0.0001$, cut- Value: > 30.5 , Sen%: 65.12, Spec%: 62.79, LHR: 1.75]. Albumin [AUC; 0.6577, P ; 0.0118, cut-off value: < 4.35 , Sen%: 67.44, Spec. %: 53.49, LHR: 1.45]. ALB/GLB was [AUC; 0.6465, P ; 0.0207, cut-off value: < 1.545 , Sen%: 64.29, Spec. %: 64.29, LHR: 1.8].

Table (2): Association of Galanin with Studied Parameters.

Parameter	r (Galanin ng/mL)	p-value
Galanin ng/mL	1.000	0.000
Age year	0.207	0.063
FSG mg/dL	0.535	<0.0001
Urea mg/dL	0.301	0.006
Uric acid mg/dL	-0.063	0.572
Creatinine g/dL	0.040	0.719
T. Protein g/dL	-0.082	0.465
Albumin g/dL	-0.100	0.374
Globulins g/dL	0.053	0.634
ALB/GLB	-0.200	0.0756

While uric acid [AUC; 0.5411, P ; 0.5116, cut-off value; < 4.75 , Sen %; 51.16, Spec %; 51.16, LHR; 1.048], creatinine [AUC; 0.5076, P ; 0.9038, cut-off value; > 0.835 , Sen %; 51.16, Spec %; 51.16, LHR; 1.048], total protein [AUC; 0.5308, P ; 0.6225, cut-off value; < 7.05 , Sen %; 48.84, Spec %; 58.14, LHR; 1.167], finally globulin [AUC; 0.5867, P ; 0.1638, cut-off value; > 2.75 , Sen %; 55.81, Spec %; 50, LHR; 1.116], were weak biomarkers in diagnosing disease.

According to results, FSG and galanin are excellent biomarkers for disease prediction, in addition, albumin, ALB/GLB are intermediate markers. While uric acid, creatinine, protein added , globulin are markers with poor predictive values, where the AUC gave less than 0.6, stopping for values included (Table 3).

Table 3: Area under ROC curve for all analyzed Parameters in T2DM

Parameter	Positive if cut-off value	AUC	Sen %	Spec %	LHR	P-value
Galanin ng/mL	> 6.14	0.858	76.74	76.74	3.3	<0.0001
FSG mg/dL	> 116.5	1	100	100		<0.0001
Urea mg/dL	> 30.5	0.7572	65.12	62.79	1.75	<0.0001
Uric acid mg/dL	< 4.75	0.5411	51.16	51.16	1.048	0.5116
Creatinine mg/dL	> 0.835	0.5076	51.16	51.16	1.048	0.9038
T. Protein g/dL	< 7.05	0.5308	48.84	58.14	1.167	0.6225
Albumin g/dL	< 4.35	0.6577	67.44	53.49	1.45	0.0118
Globulins g/dL	> 2.75	0.5867	55.81	50	1.116	0.1638
ALB/GLB	< 1.545	0.6465	64.29	64.29	1.8	0.0207

Discussion:

Globally speaking, T2DM is a severe health issue. Protein, lipid, and carbohydrate metabolic disorders are a hallmark of T2DM. It may be due to insulin resistance, insufficient insulin security, or both. T2DM is the most prevalent of the three primary forms of the disease. Ability of pancreatic cells to produce insulin gradually diminishes, which frequently occurs in context of pre-existing insulin resistance in muscles, liver, and adipose tissue [21]. This study found that FSG biomarkers are more sensitive for diagnosing T2DM. T2DM patients had higher levels of galanin than the control group. It releases a neuropeptide called galanin, composed of 29 amino acids. Human galanin has three receptors 1, 2, and 3 to have an effect. It was discovered that galanin whole body insulin sensitivity index was negatively correlated. This peptide is also present in a wide variety of tissues [3]. And plays an important role in regulating food intake and energy homeostasis [2].

Evidence suggests that T2DM is significantly affected by abnormalities in galanin activity. Insulin resistance blood glucose plays a role in galanin homeostasis. T2DM is characterized by hyperglycaemia, hyperinsulinemia, elevated plasma galanin levels decreased activation of galanin receptors. Comparison of increased insulin and slowed glucose processing. Insulin resistance is a term for it. Discrepancy between high levels of galanin and low levels of glucose processing can also be classified as galanin resistance. Considering diabetes as a problem of galanin resistance could lead to a new understanding of the disease's origin [15]. Previous research suggested that galanin and insulin might work together to increase insulin sensitivity in a synergistic manner. Galanin and insulin co-administration improved considerably over treatment with only galanin or just insulin [22]. Data from previous studies on higher levels of galanin in patients with T2DM are consistent our current research findings. According to Zhang et al. consuming galanin can improve insulin sensitivity and lower blood sugar levels. Galanin resistance is the difference between low glucose processing and high circulating galanin levels found in diabetic patients [23]. In light of a previous study that circulating levels of galanin. While it decreases in skinny women, it increases in obese women. Galanin is important in signals the hypothalamus uses to control energy and food balance. Galanin amounts in obese

participants compared to normal weight; it was much higher [24].

The study reported that galanin offers a potential target pathway that could be explored for treatment of PCOS due to its regulatory role in ovaries, where it regulates pre-ovulatory impulses of LH and prolactin[13]. Levels of urea, creatinine, and uric acid are important markers of diabetes, low circulating globulin levels associated with sex hormones are excellent indicators of risk of developing type 2 diabetes in both women and men [16]. Levels of other vital parameters contribute to detection of the disease, as elevation of urea and galanin coincided with infected individuals compared to their healthy peers, as (Table 1).

Complications of T2DM lead to other chronic diseases that lead to an increased number of deaths, in addition to retinopathy and nephropathy. Elevated levels of urea nitrogen and creatinine are one of the variants that cause CHD in people with T2DM, according to a recent study [18]. Another study reviewed factors that reduce high blood sugar; World Health Organization is working on developing and rehabilitating heart through some exercises to enhance lifestyle behaviors to manage risk factors for cardiovascular disease. Due to the spread of obesity and diabetes, this raised number of deaths around world [25].

Previous studies, it was shown galanin levels were elevated in women with gestational diabetes, as well as galanin levels were a good biomarker for predicting stomach cancer. Moreover galanin played a key role in energy balance and metabolic syndrome, as it gave high indicators in obese children compared to their peers, those with normal average weight, previous study supports the data of the current study, as it indicates a direct effect of galanin on insulin sensitivity. Galanin plays an organizing role in regulating the metabolism of bone formation in addition to increasing bone thickness in mice after galanin injection. Animals receiving galanin supplements had increased bone mineralization; increased bone density, and improved bone matrix quality, galanin levels are also associated with people with osteoporosis with T2DM.

Study limitations:

The most important limitations of this study are. Firstly, this study is a case-control study, since the association between galanin and some other biomarkers

was revealed in patients with T2DM, more prospective studies are needed to determine the exact association between them. Second: This study is small in size in one centre. More studies are needed at several other centres to confirm the study's findings. Third, the results of this study have inherent deficiencies caused by nutritional and genetic factors.

Conclusions

Present study found that the level of serum galanin was significantly higher in T2DM patients than in HCs, and it is strongly associated with FSG. Thus, our results revealed that periodic assessment of serum galanin levels could be a good biomarker for predicting the risk of T2DM infection.

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العلاقة بين الغالانين وبعض المتغيرات الكيموحيوية لدى المرضى السكري من النوع الثاني في العراق

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الخلاصة:

خلفية البحث: تتأثر قدرة الجسم على إنتاج الأنسولين بمجموعة من الأمراض الاستقلابية المزمنة، والتي تعرف بمرض السكري. يعود ارتفاع نسبة السكر في الدم لدى بعض الأفراد، إلى عدم كفاية الأنسولين المنتج من البنكرياس أو لأن خلايا الجسم لا تستخدم الأنسولين الذي يتم إنتاجه بشكل فعال. في هذه الدراسة نحاول استكشاف ما إذا كان هناك أي ارتباط بين الغالانين واليوريا وحمض البوليك والكرياتينين والألبومين والغلوبولين والبروتين الكلي ونسبة الألبومين إلى الغلوبولين والغلوكوز الصائم لدى المرضى الذين يعانون من مرض السكري من النوع الثاني. **المواد والطرق:** شملت هذه الدراسة 43 مريضاً و43 شخصاً سليماً كمجموعة ضابطة (HCs). تم استخدام مقايصة (ELISA) لتحديد مستوى الغالانين في المصل. في حين تم تحديد مستويات اليوريا وحمض البوليك والكرياتينين بالإضافة إلى الغلوكوز في مصل الدم الصائم (FSG) بالطرق اللونية الأنزيمية، وتم تقدير الألبومين والغلوبولين والبروتين الكلي (T. Protein) بالطرق اللونية. **النتائج:** وجدت الدراسة أن مستوى الغالانين في الدم لدى المرضى الذين يعانون من داء السكري من النوع الثاني كان أعلى مقارنة مع الأشخاص الأصحاء ($P < 0.0001$) وكان FSG أعلى في المرضى مقارنة مع المجموعة الضابطة ($P < 0.0001$). وقد لوحظ أن ارتباط الغالانين كان إيجابياً مع كل من FSG ، واليوريا، والكرياتينين، والغلوبولين ($P < 0.0001$). بينما كان الارتباط سلبياً مع كل من حمض البوليك وبروتين T. والألبومين والنسبة بين الألبومين إلى الغلوبولين (ALB/GLB) ($P < 0.0001$). أظهرت المتغيرات المدروسة بترتيب تنازلي للمساواة تحت منحني خصائص تشغيل المُستقبل (AUROC) أن الغالانين أظهر القيمة (0.858)، (1) FSG، اليوريا (0.757)، حمض البوليك (0.541)، الكرياتينين (0.507) و (0.530) T. Protein والغلوبولين (0.586) والألبومين (0.657). بينما بلغ (ALB/GLB) (0.646). تم تقدير القيم الحدية الجديدة للمتغيرات المدروسة على النحو التالي: الغالانين ($< 6.14 \text{ ng/ml}$)، و FSG ($> 116.5 \text{ mg/dL}$)، اليوريا ($< 30.5 \text{ ملجم/ديسيلتر}$)، حمض البوليك ($> 4.75 \text{ ملجم/ديسيلتر}$)، الكرياتينين ($< 0.835 \text{ ملجم/ديسيلتر}$)، T. Protein ($> 7.05 \text{ g/dL}$)، الألبومين ($> 4.35 \text{ جم/ديسيلتر}$)، الجلوبولين ($< 2.75 \text{ جم/ديسيلتر}$) و ($< \text{ALB/GLB}$ (1.545). **الاستنتاج:** يمكن استخدام مصل الغالانين كمؤشر حيوي للكشف عن مرض السكري من النوع الثاني وقد يكون مؤشراً حيوياً فعالاً في الاختبار التشخيصي لهذا المرض.

الكلمات المفتاحية: الغالانين، الأنسولين، مرض السكري من النوع الثاني، البروتين الكلي.