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Akabane Test—Its Capabilities and Real Application in Traditional and Modern Medicine

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Abstract

Background: Currently, for high-quality monitoring of the body, it is necessary to have many different devices with you and transmit their data to the doctor. It's expensive, complicated and ineffective. To solve this problem, we used the thermoalgometry method in the form of the Akabane test, which gives an integral assessment of the functional activity of the entire organism, including at the level of individual organs and systems, down to biochemistry. **Methods:** Using this method, we examined several thousand patients with various pathologies over 30 years. This allowed us to draw well-founded and practice-tested conclusions. As a focus group in this article to evaluate the test's performance compared to traditional diagnostic methods, test results were analyzed in more than 700 of our patients with diabetes. **Results:** Thermoalgometry data have a significant correlation with the main indicators of the body, including a number of biochemical indicators. At the same time, using the test profile, you can diagnose various diseases, and using the test indicators in the dynamics of observation, you can evaluate the biorhythms of individual organs to predict the condition for several days. A system has been developed for assessing the individual effect of drugs on various organs, their effectiveness and side effects, with determination of their optimal dose and time of administration. **Conclusion:** The thermoalgometry method opens up a new principle and source of obtaining medical information, based on the assessment of symmetry in the body under normal conditions and in various diseases.

1 Introduction

Despite various technological innovations in modern medicine, early accurate diagnosis of diseases is still a difficult problem. Now for this it is necessary to do many different examinations, the results of which will ultimately be summarized by a specialist doctor, which does not exclude erroneous interpretation during the synthesis of data. There are also great difficulties in creating a reliable and simple monitoring system for various chronic diseases, especially at home. This can be seen in the example of diabetology [1-3]. For example, for monitoring patients with diabetes, a whole set of separate devices is recommended, for example, a glucometer, cholesterol assessment devices, HbA1c -test, etc. Next, all this data must be sent separately to processing centers and analyzed by a medical specialist. All this is costly and not particularly effective in practice, which is what hinders the widespread adoption of tele diabetology. Meanwhile, there has long been a simple and effective way to carry out complex diagnostics of the body and allow for ongoing monitoring using the thermoalgometry method, known as the Akabane test [4-8], which is recognized by modern science. Over the 30 years of working with this test in Russia, we have produced more than 10 versions of such devices and received 21 patents for new design solutions and diagnostic and treatment methods.

Let us further consider the capabilities of this method and its theoretical basis from the point of view of modern medicine. All Chinese acupuncture with thousands of years of history is based on the bioenergy paradigm and the principle of assessing information through the control of acupuncture channels (AC) activity for diagnosis and treatment. From the point of view of modern physiology, the concept of "Energy" or Chi in a particular organ or system is equivalent to determining their functional activity, which can be increased or decreased. To quantify these indicators, TCM uses assessment of the activity of AC that are associated with these organs. The ACs themselves and biologically active points (BAP) on them have many distinctive properties compared to the surrounding tissues. AC have low electrical resistance, as well as thermal, acoustic, light, magnetic differences with surrounding tissues [9,10]. AC are also associated with low hydraulic resistance channels in the extracellular matrix [11,12]. For example, using isotopic substances and some protein dyes, it can be traced as they migrate through AC, exactly repeating the trajectory of its projection on the body, which proves their existence [13]. According to some ideas, the AC system is the primary signaling system in the course of the evolution of living organisms, and it arose long before the nervous and humoral ones [14]. All animals, insects and plants have systems of biologically active points connected to channels [15-17].

In this case, all information is mainly transmitted in the AC system in the form of tonic signals, including those based on coherent biophotons with phase synchronization from point to point in the chain of connections up to the target organ associated with a specific AC [18-20]. Since the AC are located symmetrically on the body, this provides a rare opportunity for the first time to evaluate the violation of symmetry in the bioenergetics of the body.

The existence of AC and their informative component should be considered in connection with the system of 5 primary elements of the TCM theory, which forms the connections of individual AC into a single body control system (Figure 1). This system was discovered more than 300 years ago [21,22]. Since then, many articles and books have been published that summarize the experience of using this system in clinical practice [23-25].

This system unites 12 main AC, which, taking into account their connections with specific organs, form 5 primary elements between which there are several circuits of relationships. One of them works in a circle of "energy circulation", transferring it from one element to another in a clockwise direction. The second regulatory circuit operates according to the "star rules" only when there is an excess or lack of activity of the primary element and the AC that are located in it. For example, an excess of AC activity of the primary element FIRE melts METAL and reduces the activity of the AC of the lungs and large intestine in this primary element. An excess of the primary element METAL similarly destroys and inhibits WOOD, and it in turn destroys the EARTH and thereby reduces the activity of the AC of the stomach and pancreas, etc. To this we must add that inside each AC there are all 5 primary elements in the form of BAT with similar relationships. Thus, due to several regulatory circuits, the entire system of 5 primary elements maintains itself in an optimal harmonious balanced state.

The structure of this distribution is confirmed by the fact that this system has been used for centuries in the practice of acupuncture, when the functional activity of a certain organ can be regulated through targeted stimulation of other systems according to the "mother-son" principle [26]. This approach is quite relevant for modern medicine.

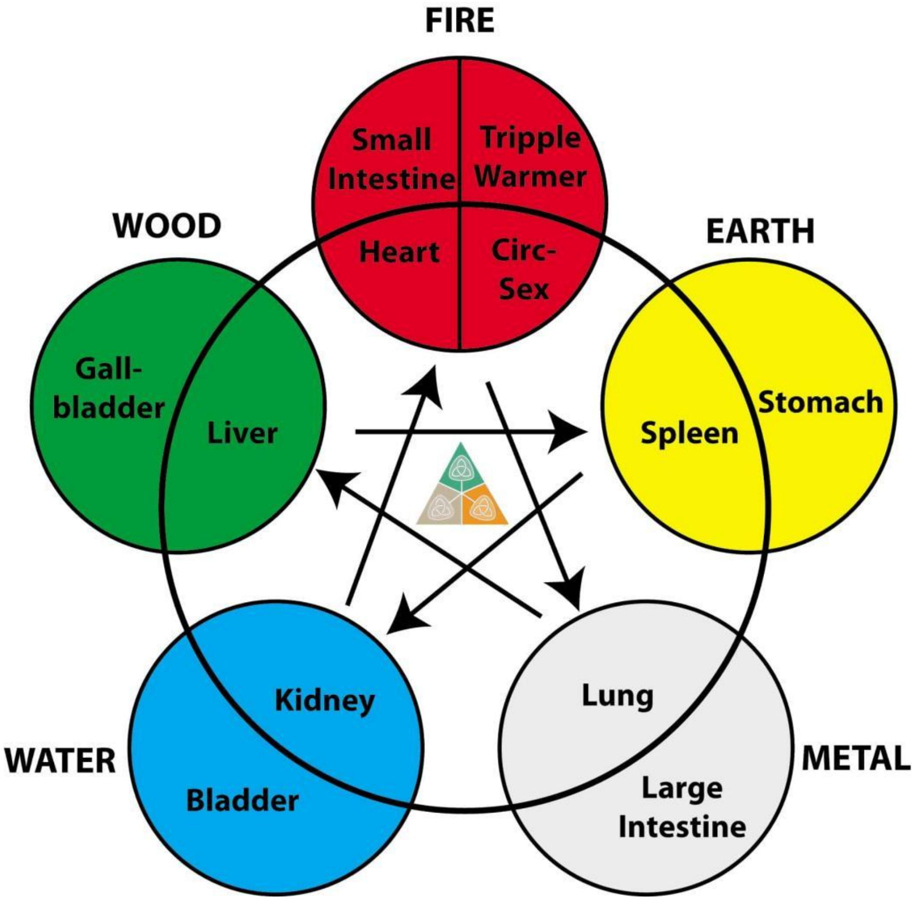

Figure 1 System of 5 primary elements at the level of 12 acupuncture channels.

2 Materials and methods

The method of thermal algometry (Akabane test), is known and recognized in the scientific world and has been widely used by us. Using this technique, 700 patients with type 1 and 2 diabetes were examined in a specialized endocrinology centre. All patients signed an "Individual Consent" to conduct these studies.

This test measures the pain thresholds in temperature sensitivity (TS) when heat is applied to the "entrance-exit" points of each channel by applying an impulse LED non-coherent IR-light onto the skin (f = 1Hz, λ = 920 nM, with the total energy expenditure in joules. In order to assess AC we used 24 standard zones, which are traditionally examined in acupuncture to evaluate the channels (LU11, LI1, PC9, TE1, HT9, Si1, SP1, LR1, St45, GB44, Ki1, and BL67) (Figure 2).

Each of these points in the TS indicators reflects the functional activity of certain organs and systems a list of which is given in the diagram. According to modern concepts, these points have a large representation in the cerebral cortex and therefore reflect a large flow of information. In general, individual pain sensitivity is the most important parameter of the body's adaptation to external conditions. The Akabane test was carried out on a certified device "Refleksomaster-RM 08". The profiles of AC were compared using t-test and Mann-Whitney test. Statistical decisions were made at a significance level of 5% ($p \leq 0.05$). Data analysis was performed with the SPSS Inc. Software.

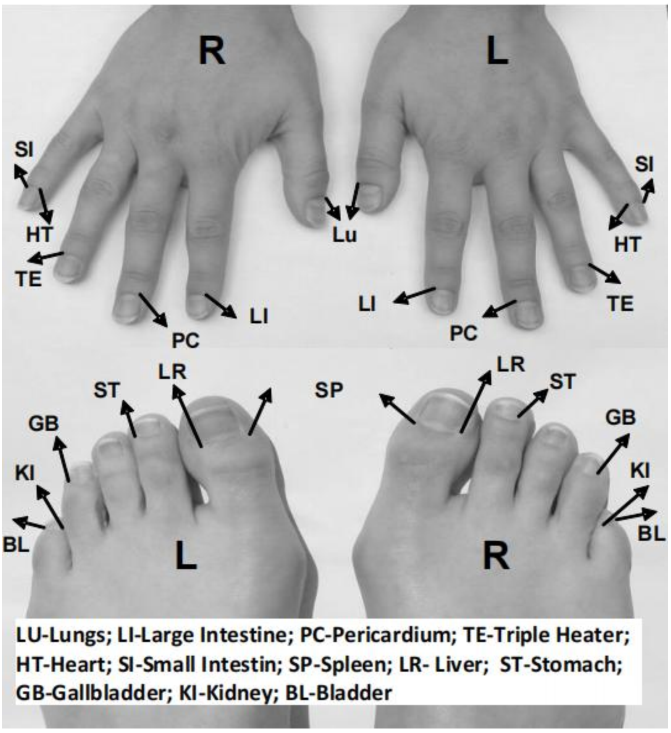

Figure 2 Topography of acupuncture points, used for evaluation of the AC in Akabane test.

3 General principles of functioning of the AC system

Based on the results of previous studies, it has been established that, at the level of 12 AC, taking into account their 24 paired branches in the TS indicators, there are internal regulatory relationships that form a stable dynamic cluster of AC, which functions according to the theory of 5 primary elements [7,8,25]. At the same time, it is worth changing one indicator, for example, during the impact on the organ associated with AC, in response, then all other indicators change as in a kaleidoscope. However, at the same time, their internal structure of connections is preserved. For example, normal TS values can be very different in magnitude, but their sum at the individual level on the right side is usually 51-52%. This is due to the fact that the right side in the test indicators reflects the level of energy accumulation—assimilation, and the left side—energy consumption and dissimilation processes [7,8,27]. Thus, the test allows you to control bioenergetics and metabolic processes in the body what can be used to assess such violations [28,29]. At the same time, the system itself operates as a single whole in the form of an interconnected ensemble with a perfect system of internal stabilization in an optimal operating mode.

Of great importance for understanding the principles of operation of this system was the discovery of a dipole structure when analyzing interchannel correlations at the TS level. These connections have a clear dipole structure at the level of positive and negative connections (Figure 3), with 2 poles of activity at the level of the primary element WATER (Yin pole) and FIRE (Yang pole). Normally the negative regulating pole (-) is in the water primary element system, mostly at the urinary bladder channels level (BL), which controls sexual activity through sex hormones. The positive regulating pole (+) is mostly concentrated at the fire primary. Using the TS indicators, you can calculate the activity of the dipole poles based on the sum of the indicators of all WATER and FIRE channels

This structure of the Yang/Yin dipole is most important in the regulation of the entire organism and its individual vital signs. Normally, this ratio is 1.62 — which corresponds to the proportion of the Golden section, as an indicator of harmony in the body. All this indicates that this bioenergetic cluster has an internal stabilization system based on the system of five primary elements, which, due to several regulatory circuits based on a pentoid structure, maintains this cluster in an optimal bioenergetic state [7,8]. In various severe diseases, the structure of the dipole is disrupted and new regulatory centers arise at the level of 5 primary elements [29,30].

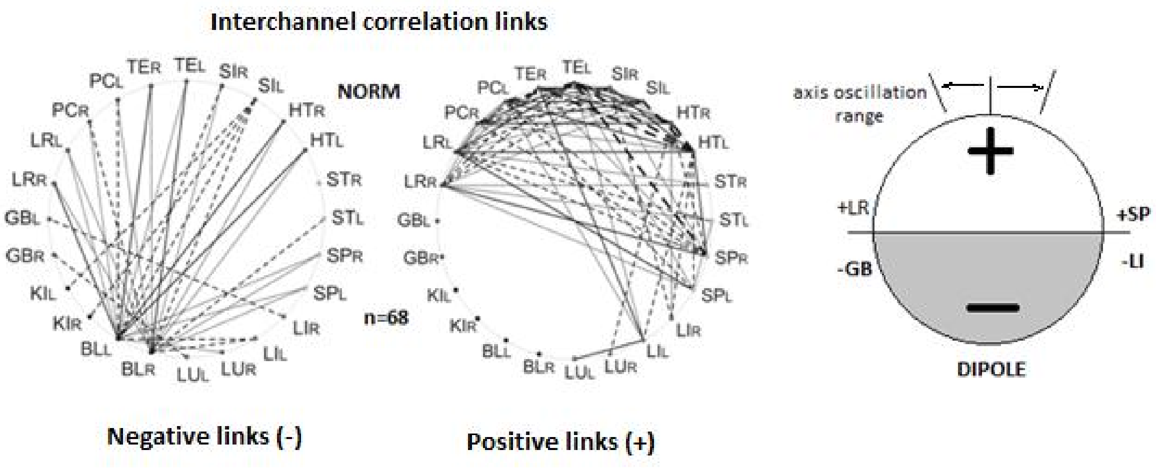

Figure 3 The matrix of interchannel connections in norm.

4 Results

4.1 Changes in dipole activity from age

To assess dipole changes with age, dipole changes were analyzed separately for men and women in a group of healthy subjects of different ages consisting of 504 people (Figure 4). The arithmetic averages of the TS and the Yin/Yang values of the dipole pole were calculated as the vertical coordinates of each point. The age of the subjects was plotted horizontally.

In general, as can be seen from the graphs, only at birth and in old age do the values of the water and fire indicators level out. The maximum asymmetry of indicators is observed in men aged 14-19 years and in women at 32-34 years old, after which the process of energetic aging of the body begins. The process of energy equalization, theoretically leading to death, ends on average at 84-86 years for women, and at 76-82 years for men, which corresponds to statistics according to which women live somewhat longer. It is interesting to note that, for example, receiving great pleasure—for example, orgasm—leads to a temporary alignment of the poles of the dipole [29].

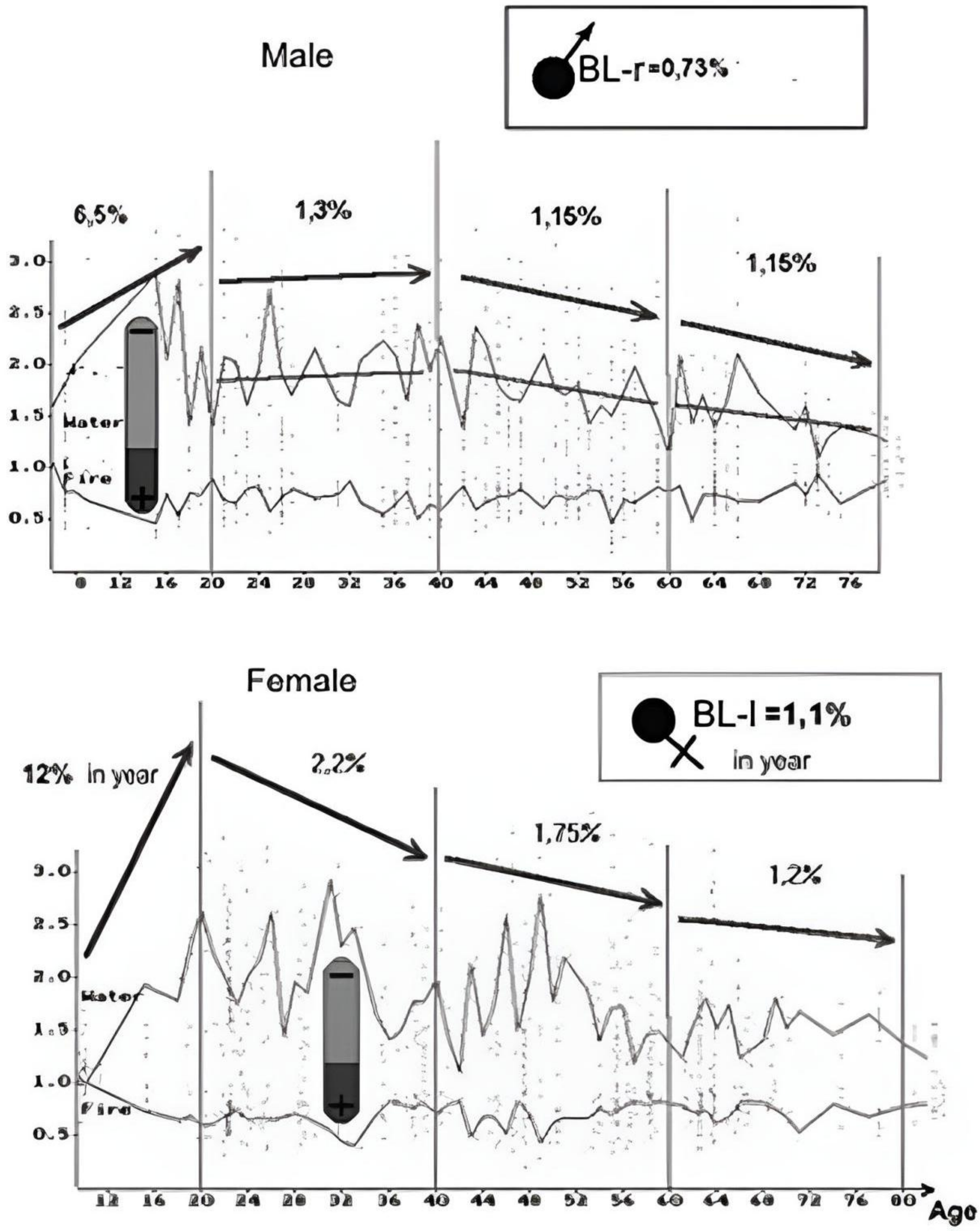

Figure 4 Graphs of energy dipole changes depending on the age of men and women.

The age of the subjects is indicated horizontally, and the activity of the poles of the dipole is vertical.

So, according to the schedule, women experience a certain cyclicity associated with periods of functioning of the hormonal reproductive system, mainly along the left branch of the BL channel. Thus, in the period from birth to 20 years, the maximum increase in the activity of the Yin pole of the dipole is noted. In the period from 20 to 32 years, this growth continues, and from 40 to 45 years, a climacteric involution is observed in the female body, which is clearly reflected on the graph in the form of a decrease in Yin. In a period of about 50 years, a “second heyday” begins, which is also reflected in the graph by an increase in the amplitude of the pole differences in the dipole. In the period from 52 to 62 years, the second wave of involution occurs, followed by a slight rise at 72-74 years, and so on. Thus, we can note the presence of several periods of oscillation of the energy dipole with an average frequency of about 4-6 and about 20 years.

The average rate of aging of the body in men is slightly lower than in women, and, according to our calculations, the right branch of the BL channel, which has the most significant the regulatory effect on the aging process in men is 0.73% per year. However, in men, the rate of development of the fire-water dipole in childhood is almost half that of women. In both men and women, dipole pulsations with a period of about 6 years are clearly visible. It is interesting to note that this pattern can be observed in all subjects simultaneously at the same time from the date of birth. Consequently, within each person there is a mechanism that forms such endogenous rhythms, synchronized with the onset of a certain age.

Since TS indicators are determined in Joules, this allows the widespread use of mathematical analysis to assess their relationships with various indicators and in each specific case to identify such regulatory centers for targeted support in order to mobilize the body's reserve capabilities. In general, this AC system in its dynamics of change acts as a self-regulating dynamic ensemble, and thermoalgometry indicators of individual AC provide visual information about the functional activity of various organs and systems and allow the assessment of metabolic disorders and rhythmogenic processes in the body.

4.2 Possibilities of thermoalgometry for monitoring patients with diabetes

We took diabetes, a widely occurring disease, as a model pathology reflecting the main diagnostic capabilities of the Akabane test. Based on the results of a survey of 350 patients with T1D (diabetes mellitus type 1) using thermoalgometry, a number of interesting possibilities of this method were identified that can be used for effective monitoring in diabetes.

4.2.1 Determining the underlying mechanisms of control of pancreatic A and B cell activity using thermoalgometry is critical for monitoring diabetes, especially T1D

To build models of connections between acupuncture channels and various biochemical indicators, we used the method of multiple linear stepwise regression, where the input is 24 channels and the output is glycemic indicators. Next, all possible models were built with the number of these channels, after which they were ranked in descending order by the R-square criterion. As a result, the most suitable models were obtained. Based on the analysis of the relationships between AC and the level of glycemia in T1D in patients with partially preserved B-cell function, a main group model was obtained (Table 1), almost identical for men and women, which included 4 AC [7,8,29,30].

Table 1 A regression model linking blood glucose levels with channels.

AC	Coefficient	SE	t	*p*
Constant	17.32	4.93	3.51	0.001
SPl	-7.95	2.38	-3.33	0.002
LRr	6.56	1.31	5.00	0.002
STr	-9.12	3.64	-2.50	0.017
SPr	4.37	1.37	3.19	0.002

Note: R-SQ. (ADJ.) = 0.66, SE = 8.36, MAE = 5.65, DurbWat = 1.92. 79 observations fitted, forecast(s) computed for 0 missing val. of dep. var.

Table 1 illustrates that right and left branches of the most channels cause opposite effects of glucose blood level, and such lateralization is the clue to comprehension of AC function. In this model, the left branch of the pancreas channel is associated with the (-) glucose levels, while the right one is associated with (+). The right branch of the stomach AC also has a significant link ($p < 0.05$) with (-) and the right branch of the liver AC with (+). Based on this model, a model of connections between the diagnostic point SP1 and the glycemic level was created (Figure 5).

In Figure 5, which illustrates this regression model, it is shown that, for example, the right diagnostic point SP1 in the AC of the pancreas in terms of thermoalgometry reflects the activity of its B cells that produce insulin, which reduces the level of glycemia. The left point in its TS indicators reflects the function of A-cells, which, due to the production of counter-insular hormone, increase blood sugar levels.

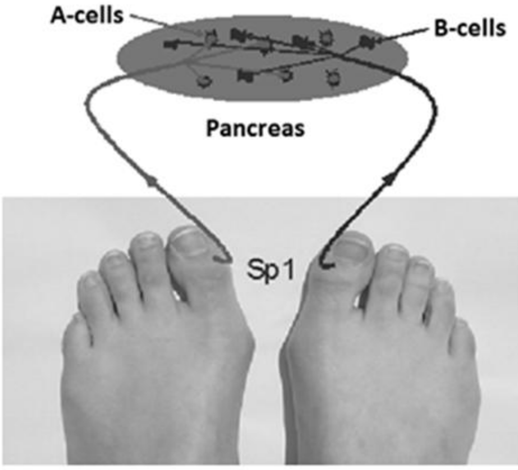

Figure 5 Connections of the diagnostic point of the pancreas (SP1), with its A and B cells.

4.2.2 Assessment of biorhythms of individual organs and body systems

This process can be represented in the form of a kind of "carbohydrate scale", on the right and left side of which are all the AC indicators with opposite vectors of influence, which are taken from the regression model. It is especially effective to build such regression models based on individual data in order to establish which systems and organs have the greatest influence on the regulatory processes of maintaining homeostasis of carbohydrate balance (Figure 6). Normally, the total "resulting weight" on both scales is approximately the same. If the right bowl predominates, then hyperglycemia occurs, and if the left bowl predominates, then hypoglycemia occurs. This mechanism is universal for other AC and the regulation of all basic parameters of the body. In this case, the sign (vector), the influence of a particular AC and its weight can be determined by the regression coefficient for each AC in the model. It should be noted that the TS indicators of the right and left branches of the AC usually have opposite vectors of influence on the regulation of the same parameter. It has also been established that the TS of the channels changes earlier than the glycemic indicator due to the buffering properties of the blood; therefore, by determining these indicators, especially in the dynamics of observation, it is possible to predict in advance the level of glycemia for the next period in 20-30 minutes.

During the life of the body, these 2 subsystems with opposite vectors of influence on the level of glycemia are in constant rhythmic oscillatory movement, and due to this, regulation of glucose in the blood occurs. The trajectory of these rhythms can be recorded graphically using TS measurements in the dynamics of observation (Figure 6). More precisely, the parameters of rhythmic activity can be analyzed, for example, through Cosinor analysis with an assessment of the frequency of oscillations, periods and phases of rhythms [31].

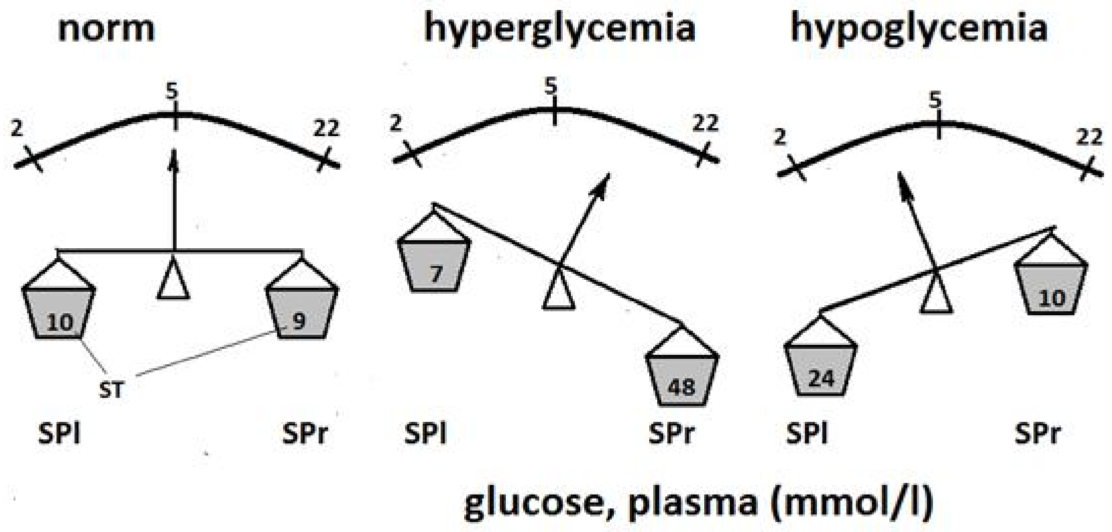

Figure 6 Models of regulation of glycemic levels in normal and pathological conditions.

4.2.3 Forecast of the body's condition

In general, biorhythms, especially with the rhythmic routine of a particular person's life, are stable and can be extrapolated to a certain time in the future, to predict the situation for a specific organ of its functional activity at least 1-2 days in advance. This makes it possible for the first time to carry out targeted prevention and correction of expected crises in advance on new principles [32].

For example, the level of glycemia in T1D according to an individual regression model based on TS measurements in one of our patients during observation depends mainly on the activity of several AC. If, based on Cosinor analysis, we make an assessment of the periods and phases of each of these AC, then we can extrapolate this rhythm for the near future. Then, moving along the time axis on the graph, you can digitize the estimated TS values at any point in time and, based on the formula of the regression model, calculate the probable level of glycemia 1-2 days in advance to correct adequate therapy [33].

So in Figure 7 presented is a fragment of a recording of the biorhythms of several AC lasting 90 hours, significantly affecting the level of glycemia of one of our patients. Moreover, due to the interference of the biorhythms of several speakers with different periods, phases and frequencies, during a period of 70 hours the calculated blood sugar level was 6 mMol/L, and after 5 hours it was already 14 mMol/L. This forecast has good convergence with real control measurements, especially if you use a large training sample and calculations through neural networks. This principle of predicting the condition well explains the fact of sudden jumps in glycemic levels even with the most careful adherence to the nutritional and therapeutic diet. It is universal and can be used to predict, for example, hypertensive crises, renal or respiratory failure, etc., which allows timely prevention and improvement of the quality of life of such patients.

4.2.4 Disease diagnosis on the basis of test indicator profiles

Since disturbances in the activity of organs and systems are reflected in changes in the TS of the AC associated with them, a new opportunity arises for diagnosing various diseases using test profiles. In Figure 8 averaged TS indicators are presented in normal conditions, with myocardial infarction and with acute pancreatitis. The scale used here is the Kiviat diagram with 12 axes according to the number of AC in the system of 5 primary elements. In general, there is a striking contrast in the indicator diagram, which shows the enormous diagnostic potential of this method. Just as a fingerprint is individual for each person, the test profile allows for effective diagnosis of various diseases with high accuracy, even with a visual assessment. The use of discriminant analysis along with visual assessment of TS profiles makes it possible to diagnose various diseases with high accuracy even in the early stages.

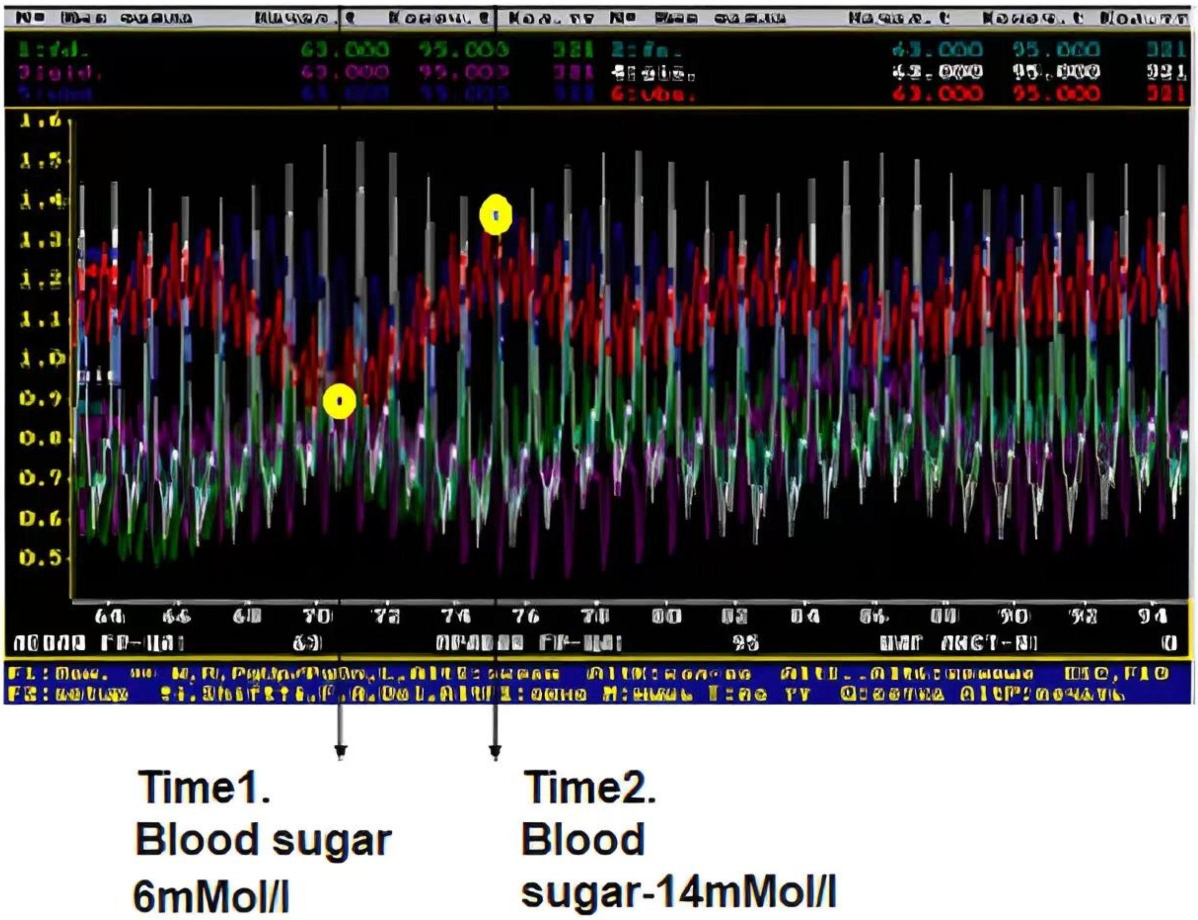

Figure 7 Fragment of biorhythm recording for 90 hours with calculation of glycemic level.

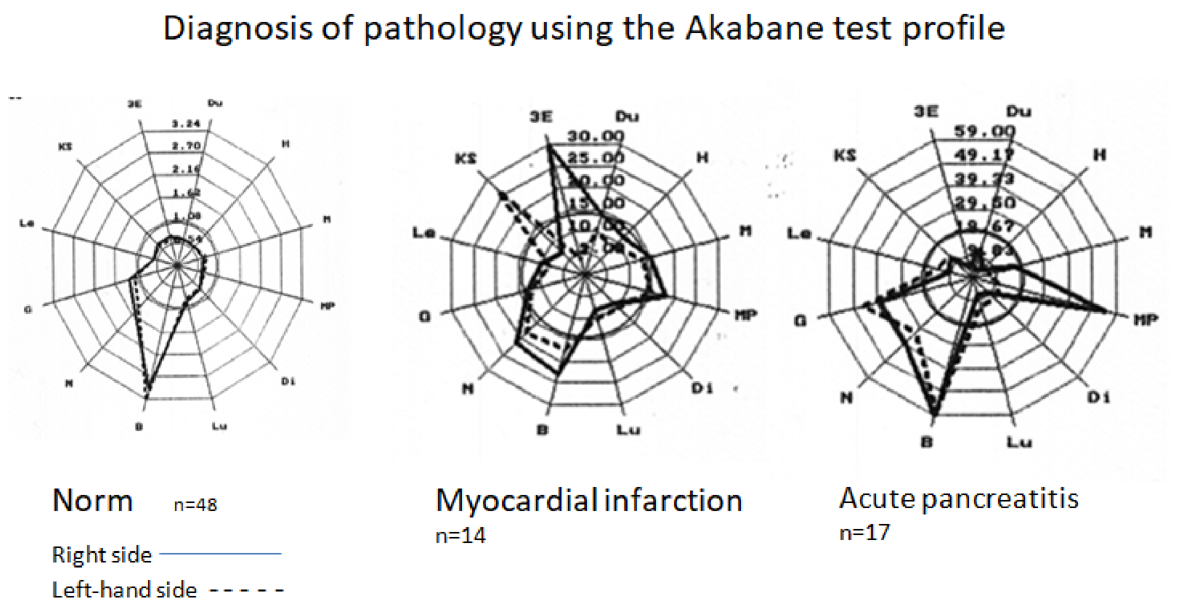

Figure 8 Averaged TS profiles of the Akabane test in Kiviat diagrams in normal conditions, in myocardial infarction and acute pancreatitis.

In Figure 9 shows test profiles for T1D in comparison with the norm in men and women. They have significant differences, which are most pronounced in terms of AC of the pancreas, liver, and stomach. These differences are confirmed by the t-test and Mann-Whitney test data in Table 2.

Table 2 Comparison of test profiles between T1D and norm.

AC	Male		Female	
	t-test	M-W	t-test	M-W
LU	*** < 0.001	** < 0.003	*** < 0.001	*** < 0.001
LI	+ 0.088	* < 0.014	*** 0.001	*** < 0.001
PC	0.822	0.453	** < 0.006	+ 0.092
TE	0.260	0.348	*** < 0.001	*** 0.001
HT	0.652	0.611	** < 0.002	* < 0.021
SI	0.402	0.814	*** < 0.001	**< 0.002
SP	*** < 0.001	* < 0.018	*** < 0.001	*** < 0.001
LI	*** < 0.001	0.135	*** < 0.001	*** 0.001
ST	*** < 0.001	0.530	*** < 0.001	** < 0.006
GB	*< 0.023	0.582	** < 0.003	* < 0.044
KI	+ 0.070	0.435	*** < 0.001	*** < 0.001
BL	** < 0.003	+ 0.089	* < 0.011	* < 0.019

Note: Significances and tendencies. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, + tendency.

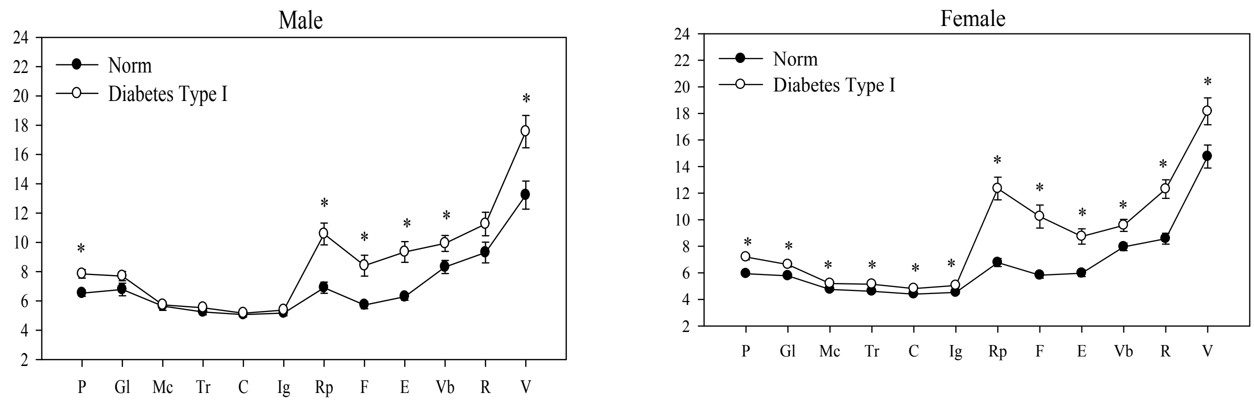

Figure 9 Profiles of averaged TS in comparison of T1D and the norm in men and women. (* significant differences, t-test.)

Even more pronounced differences are usually noted at the level of 24 branches of 12 AC (Figure 10). Since the TSs of the right and left AC branches reflect opposite metabolic processes, in this case a unique additional opportunity arises for their assessment in organs that are associated with specific AC [27,28]. Typically, with diabetes, such disorders become very pronounced. Thus, by comparing individual tests with standard averaged samples of test profiles in the norm, it is possible to assess the individual characteristics of a particular disease already at the level of a specific organ or system and track changes during treatment. Moreover, treatment in such cases can be targeted, taking into account metabolic disorders at the moment in a specific organ.

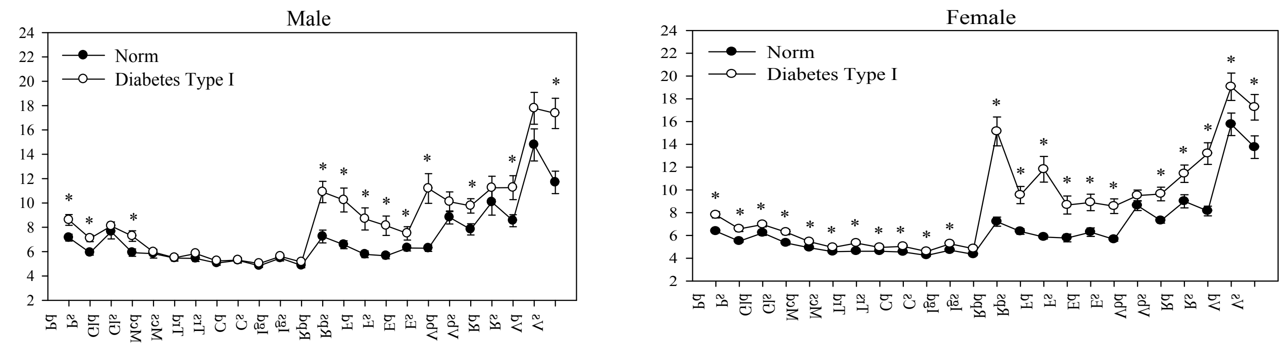

Figure 10 Comparison of TS profiles at the level of 24 AC branches between normal and T1D.

4.2.5 The role of asymmetry in Akabane test profiles

From the general concept of connections between A and B cells of the AC of the pancreas, one can conclude the importance of symmetry breaking in their TS parameters. The increase in TS indicators during the Akabane test generally corresponds to the functional failure of the organ, proportional to the increase in TS. Since the vectors of influence on the right and left in one AC usually have the opposite direction on the metabolic function of the organ, these changes are especially contrasting when assessing the Right/Left asymmetry coefficient.

Normally, the level of AC asymmetry usually does not exceed 10-20%. The exception is AC-BL, which reflects the activity of sex hormones, which varies depending on life circumstances. On the graph (Figure 11), the maximum asymmetry in T1D compared with the norm, especially in women occurs in AC of the pancreas and liver in which there are maximum metabolic disorders. This graph also shows the deviation corridors of the TS parameters during monitoring, which differ sharply for different AC. Those AC that have a large deviation, as a rule, are most important in the regulation of glycemia due to additional compensatory mechanisms, since such a system thus changes its parameters maintaining the overall homeostasis of the body in response to high or low glycemic values [7,8,28]. If the organ or system does not participate in this regulation, then the TS deviation will be insignificant. This circumstance must also be taken into account during targeted treatment.

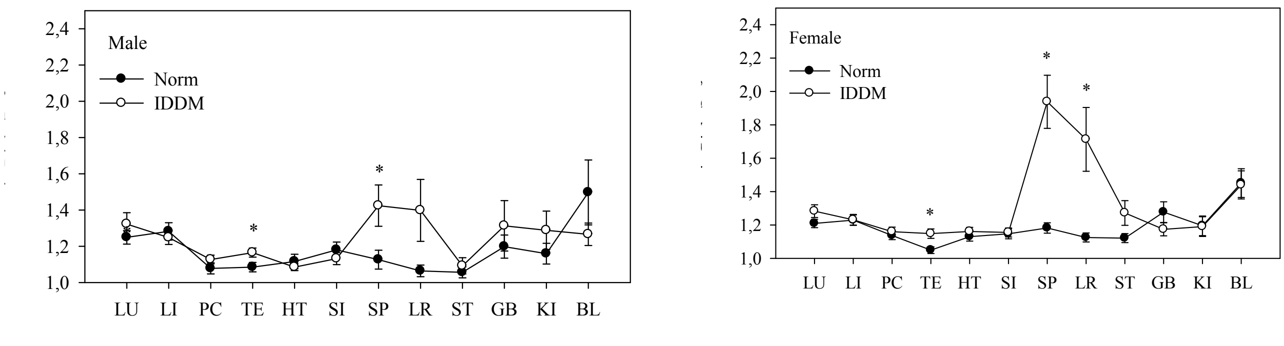

Figure 11 Ratios of Right/Left TSs of channels when comparing healthy subjects and those with T1D (IDDM). (* significant differences, t-test.)

4.2.6 Non-invasive assessment of glycemic levels

It was previously established that the level of TS and the coefficients of their asymmetry for a number of AC changes in proportion to the level of glycemia [7,8,28,30]. This can be either a positive or negative dependence. Moreover, if the individual coefficients of relationships in these dependencies are known, then it is possible to calculate the level of glycemia non-invasively, based on "training measurements" with an accuracy acceptable for home measurements of more than 90% [34]. Even better results are achieved when using neural networks after they have been trained during individual monitoring.

4.2.7 Individual assessment of the effect of medications, their optimal dose and time of administration

Since the level of deviation of the TS of a certain AC changes in proportion to the change in the level of glycemia, it is logical that this indicator is the most significant marker for monitoring the effect of drugs in diabetes mellitus. In general, a simple rule emerges: high glycemic levels give a proportional increase in the asymmetry of a number of AC, and a correctly individually selected drug neutralizes this asymmetry, which underlies a new patented method for assessing the effects of drugs at the individual level [32,35-38]. In Table 3, a number of AC are presented that have a significant effect on the level of glycemia in T1D and T2D (diabetes mellitus type 2), and at the same time, respond most strongly to insulin administration. Basically, these are the same AC, but these are their different branches, at the right/left level. This situation is equivalent in meaning to the glucose regulation model in Figures 5 and 6, with the difference that on the scales we "weigh" the antidiabetic (glycemia-lowering) potential of a particular drug, which is determined by the vector of influence (+ or -) on glycemia and by the regression coefficient on individual models.

Table 3 Connections with general blood sugar levels for diabetes of both types.

Increase in sugar	LRr	SPr	STl	LRl	LIl	PCl	TEl	LUl	GBr
Reduction in sugar	LRl	SPl	STr	KIr	SIr	PCr	TEr	LUr	GBl

In Figure 12, individual graphs of changes in the coefficient of ratio of the TS indicators of the right and left branches of the pancreas AC in T1D are presented in response to the administration of different doses and types of insulin. So, with the introduction of 10 units of insulin in the upper graph, the asymmetry is leveled, which is accompanied by normalization of glucose levels. This means that this dose is optimal and the drug itself is effective. The second graph shows a situation where a certain type of insulin does not produce the desired response. Therefore, such a drug would not be indicated for this patient. Thus, this method allows you to individually select the most effective medicine from several. The third graph shows the reaction when a dose of 20 units of insulin was excessive. In this case, the right/left ratio of this AC was less than 1.0, which is clinically accompanied by hypoglycemia. In this way, the optimal dose of medication and timing of administration can be individually assessed, which is crucial for effective monitoring of such patients [37,38].

These rules also apply to other diseases, for example, when choosing medications and their dosage for hypertension. Initially, with this method, the effect of blood pressure on certain AC is assessed using a regression model. Next, a regression model is built for the effect of different doses of a hypertensive drug on certain AC. In this case, the target channels in both cases must be the same, but there must be an opposite laterality or sign so that the opposite vectors of influence overlap each other [8].

4.2.8 Therapeutic effect of the Akabane test

During the test, a certain amount of IR energy is sent to specific diagnostic points of each AC, which is generally proportional to the functional deficiency of the AC and the organ that is associated with it. Thus, its targeted stimulation occurs as a feedback function "at its request". Thermal energy itself is a natural factor, tropic for humans. In general, during the test the entire system of 5 primary elements is harmonized and the test has a significant therapeutic effect, especially with its frequent use.

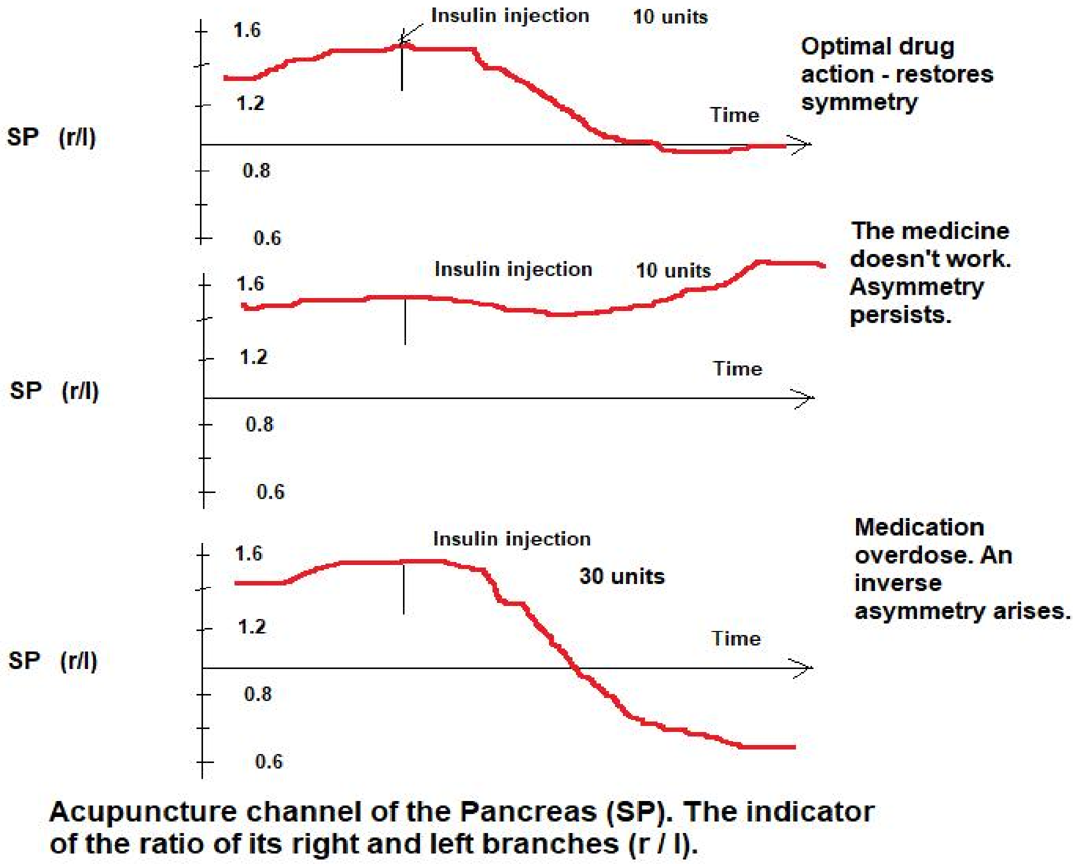

Figure 12 Graphs assessing the effect of different doses and type of insulin on the asymmetry coefficient of pancreatic AC in T1D.

4.2.9 The Akabane test is a functional energy load test

This test involves a direct dosed energy impact on the AC and the organ associated with it, which can be regarded as a diagnostic test with its functional load. For example, often at rest there are no characteristic signs of coronary artery disease when recording an ECG. That's why stress tests are carried out, for example, on a bicycle ergometer, and then all the hidden symptoms become obvious on the ECG. In the case of the Akabane test, the energy impact on the AC has a similar effect and as a result we obtain statistically reliable data reflecting the real situation.

However, the widespread use of this method is still hampered by its complex implementation. And this is its main drawback.

5 Discussion

Currently, diabetes has reached pandemic levels, affecting more than 400 people worldwide with type 1 and 2 diabetes. In lower-middle-income countries, diabetes mortality rates increased by 13%. The International Diabetes Federation (IDF) estimates that diabetes will affect over 552 million individuals worldwide by 2030 [39].

Therefore, the most advanced technological developments are currently used for diabetes monitoring, especially in the field of telemedicine. These are devices for tele diabetology with continuous monitoring of glycemic levels based on implanted sensors, smart insulin pumps connected to a Smartphone through mobile applications. However, if we consider the currently existing monitoring methods using the example of diabetes, they are all aimed mainly at assessing blood sugar levels, in various, mostly invasive ways—which is painful and expensive, since complex equipment is required. This data on the level of glycemia, for example, for home monitoring, must be transferred to the doctor for analysis and his repeated consultation must be organized, which is also inconvenient.

Therefore, for an integral assessment of the body, for 30 years we have used the thermoalgometry method based on the Akabane test, which is recognized in the scientific world.

The presented sample included enough people of different genders and ages, places of residence, and many concomitant diseases typical of diabetes. This suggests that the research findings described are generally applicable to a broad class of people with diabetes. This monitoring system is constantly being improved by expanding the database, thereby increasing the overall accuracy of the assessment.

To assess the condition, it uses distal reflexogenic zones, which, according to modern data, have a large representation in the cerebral cortex and therefore reflect a large flow of information. In general, individual pain sensitivity is the most important parameter that determines the basic adaptive properties of the body and the psychosomatic state of a person.

If we consider separately the advantages and disadvantages of the thermoalgometry method in comparison with the classical method of monitoring patients with diabetes by glycemic level—then we can highlight more than 9 of its main advantages, which were mentioned earlier. It should be added that this method of monitoring diabetes is also non-invasive, which eliminates many problems.

The extensive practice of using this method for the first time clearly shows the enormous importance for diagnosing violations of local symmetry in the human body, on the basis of which it is possible to identify and control the course of various diseases on new principles. Modern medicine does not take into account the laterality of biochemical substrates, which, in our opinion, is also of great importance for monitoring diabetes. For example, blood sugar is not homogeneous in its composition and, due to different polarization of light, is divided into dextroses, which rotate the light beam to the right, and levuloses, which have left polarization. It can be assumed that the left and right branches of the AC somehow selectively respond to the polarization of carbohydrates and reflect their concentration in their TS during thermoalgometry [8]. An important feature of the method is also the high accuracy of assessing the functional activity of organs and systems based on TS measurements. Thus, the accuracy of non-invasive glycemic assessment using the TS calculation method based on individual regression models exceeds 90% in comparison with classical biochemical methods. This technique was patented by us back in 2000, but unfortunately it was not widely spread due to the opposition of large corporations that produce glucometers and strips for them.

A well-known folk proverb says that: "Every medicine heals some organs and cripples others". Using this thermoalgometry technique, you can determine the side effect of any drug and assess which organs and systems such an effect affects. It is possible to quantify the severity of the negative impact and compare the benefits and harm from it [37]. This assessment is based on the emergence of new asymmetries on those AC that were previously in symmetrical harmony. Based on this technique, it is also possible to design an individual composition of drugs from their combination in order to minimize side effects.

Let's consider through what mechanisms this accuracy is achieved? Standard thermoalgometry evaluates 24 pain thresholds in Joules. Moreover, all these indicators are interconnected, like Fibonacci numbers. If 1 indicator changes, all others change depending on the state of the body. In essence, the AC system is a dynamic cluster where all organs and systems are interconnected through a multi-circuit regulation system based on 5 primary elements. Here we can draw an analogy on the principles of this system's operation with the recently widespread method of identifying a person from a photograph or based on video recording using neural networks and AI [40,41]. So, from a photograph, this system determines the points of the eyes, nose and mouth on the face — usually 7 points or more. Then neural networks determine the size of the distance vectors between them with a set of numbers of a fixed length, which are compared with each other using databases on the server and thus the person's identity is determined. In 2014, Facebook launched the DeepFace service, which determines whether two photographed faces belong to the same person with an accuracy of 97.25% [42], and the FRT system was recognized as the best solution in 2020: its recognition accuracy was 99.97%. In contrast to this technique, with thermoalgometry we evaluate 24 reference indicators, which, unlike indicators on the face, are not static, but reflect in their totality the main changes in the body, right down to biochemistry. This makes it possible to carry out the proposed monitoring and diagnostics in general on new physical principles by calculation due to a larger number of analyzed interrelated data.

The main problem in the widespread acceptance of this method also lies in the recognition, based on many different studies, of the role of AC as a specific signaling system in the human body [7,8,21-26]. The AC system actually influences various functions of the body and at the same time, through monitoring its activity using the thermoalgometry method, it is possible to monitor events at the level of various organs and systems at the moment. This property of reflecting the functional activity of organs and systems in TS indicators is actually used by us for effective monitoring.

However, difficulties in implementing the test significantly reduce its widespread use in medicine.

The most effective solution in this area is the creation of a "Pulse diagnostics of the body" system [43]. It is known that experienced Eastern doctors make effective diagnostics of the body based on pulse wave analysis. From the point of view of modern physiology and according to the "theory of functional systems", the performance of the heart reflects the work of all other organs and systems of the body [40,41,44,45]. It is important to correctly decipher this code, which is embedded in the rhythm of the heart and the phase and spectral parameters of the pulse wave. This was done on the basis of extracting from the pulse wave its 2nd acceleration derivative a number of indicators that have a high correlation with the TS indicators of various AC. In this case, the AC are an intermediate translator and decoder of the information contained in the pulse wave, since it is likely that this information in the pulse component is aimed at controlling AC system, which delivers it to certain organs and systems. The pulse wave thus, through its rhythmic components and phase components, synchronizes the work of the entire organism as a single whole. Ultimately, through the Pulse Diagnostics system, a chain of actions is built to obtain comprehensive information about the functioning of the body on new principles in real time, in a simple and convenient way for the user through a pulse wave sensor, for example, on the wrist in the form of a bracelet [43]. Based on this basic platform, you can create many useful applications in the form of software for Smartphone, for example, for monitoring various chronic diseases, and for monitoring a normal healthy lifestyle. For example, such a system can individually monitor the effects of food products, dietary supplements and medications, and be used for sports medicine and fitness, women's and men's health, weight control, etc.

6 Conclusion

The examples of using the thermoalgometry method presented in this article show its enormous diagnostic and prognostic capabilities, which, however, remain underestimated in modern medicine. The main obstacle to this is the skeptical attitude of Western medicine towards Eastern medicine and in particular towards traditional Chinese medicine (TCM), despite the thousand-year successful history of its use. In this regard, with the help of mathematics we are trying to build bridges of mutual understanding between Eastern and Western medicine [7,8].

We hope that the thermoalgometry method will still find a worthy place in modern medicine, especially taking into account its combination with pulse diagnostic methods in which the Akabane test still remains the main theoretical basis for assessing the information received.

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Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author Contributions

The conception and design of the study: V.M.; Acquisition of data, or analysis and interpretation of data: V.M., R.M., K.N.; Drafting the article or revising it critically for important intellectual content: V.M., R.M., K.N.; Final approval of the version to be submitted: V.M., R.M., K.N. All authors have read and agreed to the published version of the manuscript.

Ethics Approval and Consent to Participate

All patients signed an “Individual Consent” to conduct these studies.

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Availability of Data and Materials

The data presented in this study are available on request from the corresponding author.

Supplementary Material

Not applicable

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