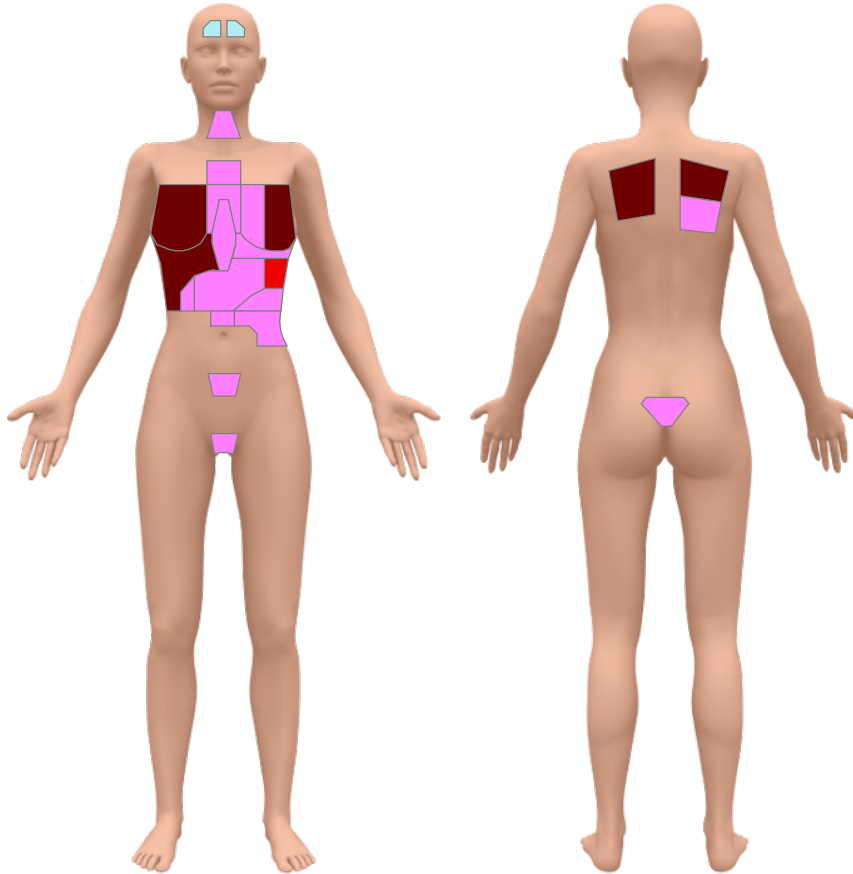




Attention! The obtained automatic reports are not a reason for the establishing clinical diagnosis. In case the stable abnormalities are revealed it is necessary to see a doctor for the detailed examination.

**Electrosomatogram**



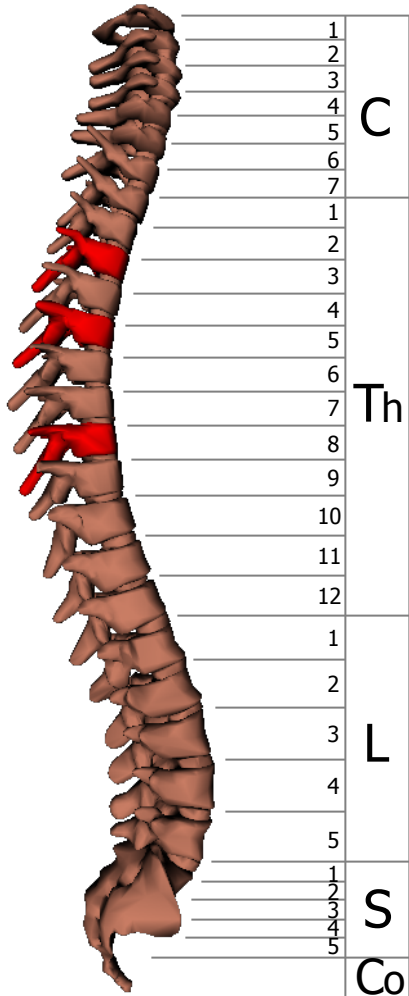
- overstrain
- stress state
- hyperactivity
- normal range
- fatigue
- over-fatigue
- body reserve depletion

Show only areas with deviations from the norm

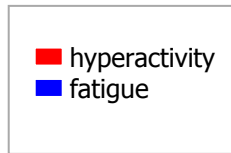
**Target zones**

- 100% Superior lobe of left lung region
- 71% Superior lobe of right lung region
- 65% Right breast region
- 65% Left breast region
- 65% Liver region
- 37% Spleen region
- 27% Trachea region

## Lesions in spine



	Probable symptoms
Th 3	Bronchitis, asthma, pleuritis, pneumonia
Th 5	Liver function disorder, jaundice, blood-clotting disorder
Th 8	Digestive disorders, hiccup, respiratory disturbance



## Assumed pathology

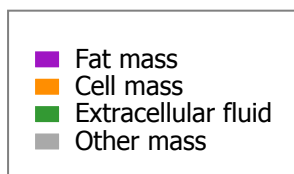
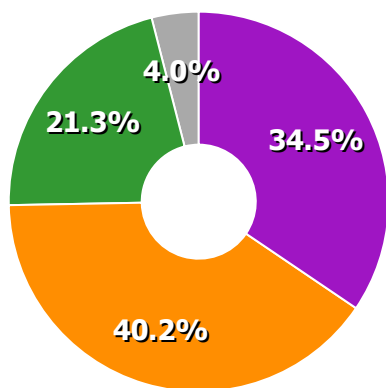
Pneumosclerosis. Mastopathy. Steatohepatitis. Immunodepression. Bronchopulmonary system diseases (tracheitis).

## Measurement table of bioimpedance

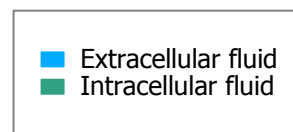
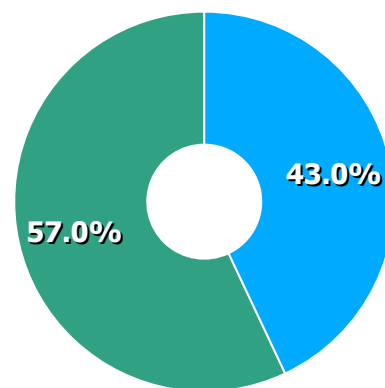
	<b>50000 Hz</b>
Right hand - Right foot	R 445 Xc 85
Left hand - Left foot	

Parameter	Value	Normal value
Height (cm)	170	
Weight (kg)	85	
Waist circumference (cm)	103	
Hip circumference (cm)	107	
Body mass index (kg/m <sup>2</sup> )	● 29.4	19.5 - 26.0
BMI classification	Overweight	
Waist-hip ratio	● 0.96	0.60 - 0.85
Phase angle (degree)	● 10.87	5.64 - 8.55
Fat mass (kg)	● 29.3	12.5 - 20.1
Proportion of fat mass (%)	● 34.5	14.7 - 23.6
Lean body mass (kg)	55.7	42.9 - 62.9
Cell mass (kg)	34.2	26.9 - 43.3
Proportion of cell mass (%)	● 61.4	50.0 - 56.0
Skeletal muscle mass (kg)	● 29.0	20.7 - 25.8
Proportion of skeletal muscle mass (%)	● 52.1	37.1 - 46.2
The total liquid (kg)	42.1	38.4 - 43.0
Extracellular fluid (kg)	18.1	12.8 - 19.6
Intracellular fluid (kg)	24.0	18.9 - 30.3
Basal metabolism (kcal/day)	1737	

Body mass distribution



Body fluid distribution



### Calculation of body composition

	Deficiency	Normal value	Overage
<b>Body mass index (kg/m<sup>2</sup>)</b>	19.5	26.0	29.4
<b>Waist-hip ratio</b>	0.60	0.85	0.96
<b>Phase angle (degree)</b>	5.64	8.55	10.87
<b>Fat mass (kg)</b>	12.5	20.1	29.3
<b>Proportion of fat mass (%)</b>	14.7	23.6	34.5
<b>Lean body mass (kg)</b>	42.9	62.9	
<b>Cell mass (kg)</b>	26.9	43.3	
<b>Proportion of cell mass (%)</b>	50.0	56.0	61.4
<b>Skeletal muscle mass (kg)</b>	20.7	25.8	29.0
<b>Proportion of skeletal muscle mass (%)</b>	37.1	46.2	52.1
<b>The total liquid (kg)</b>	38.4	43.0	
<b>Extracellular fluid (kg)</b>	12.8	19.6	
<b>Intracellular fluid (kg)</b>	18.9	30.3	

## Explanations corresponding to the calculated values

**Body mass index** (kg/m<sup>2</sup>) BMI is a weight to height ratio of a person. This value makes it possible to evaluate how well these measures relate to each other. It is used for the assessment of obesity or cachexia level. The body shape and bone tissue thickness have direct impact on BMI. The same BMI value (depending on the availability/conditional absence of muscle mass) can relate to a person of solid build/obese or athletically built/fit person.

*Observed value: 29.4 kg/m<sup>2</sup> (Normal range: 19.5 - 26.0 kg/m<sup>2</sup>)*

**Phase angle** (deg) It can be considered as a score of muscle tissue state and performance capability as well as a score of metabolic activity. Healthy people are characterized by phase angle score in the upper range of the interval of allowed values. When the person is healthy, high values point to the good state of cell membranes as well as high activity and high proportion of musculoskeletal mass. Sick people (especially with chronic illnesses) are characterized by phase angle score in the lower range of the interval of allowed values. As a general rule, the lower the values, the more unfavorable prognosis for a disease.

*Observed value: 10.9 deg (Normal range: 5.6 - 8.6 deg)*

**Fat mass** (kg) The total mass of the body fat cells. Standard levels of the body fat mass are varied between men and women. Normal levels are defined depending on height and age. Too high proportion of fat mass results in the negative changes of metabolism, which make further fat gain easier. Guarding health and body shape throughout a long period of time is only possible when values are set in the normal range. Each kilogram of fat is about 7000 kcal. Such a high level of energy explains why it is much harder to degrade fat than muscle mass (1100 kcal per kilogram).

*Observed value: 29.3 kg (Normal range: 12.5 - 20.1 kg)*

**Lean body mass** (kg) The part of the body mass including all tissues which are not fat: muscles, all organs, the brain, nerves, bones and all body fluids.

*Observed value: 55.7 kg (Normal range: 42.9 - 62.9 kg)*

**Cell mass** (kg) This part of the lean body mass depends on the age, height and genetic characteristics. Body cell mass includes muscles, organs, the brain, and nervous cells. Therefore fat degradation and maintenance of cell mass (fat loss occurs in this particular tissue) are very important aspects of weight loss. Cell mass loss is a main reason of failure with maintaining the weight loss because the progress is hindered after the first successes. Consequently, it is necessary to keep an adequate nutrition of the cell mass. The proteins should be included in the diet. They are 'building blocks' for all the body cells, enzymes, hormones. Exceptionally proteins can be a source of energy. The body constantly needs proteins because it is essential for the cell mass maintaining. Dietary fats are the source of fat-soluble vitamins A, E, K, D, essential fatty acids, lecithin. The fats are vital source of energy. The fats are part of cells and cell organelles, they are involved in the metabolic processes. Normal proportion of body fat is an important condition of a good health, performance capability, and well-being. Excess of dietary fat can be a threat of liver and pancreas illnesses, obesity, atherosclerotic vascular disease, cholelithiasis. Carbohydrates are the source of energy for all body cells. They form certain enzymes, hormones and other biologically important compounds when paired with proteins. Complex carbohydrates satisfy the appetite perfectly. Carbohydrate-rich foods are potatoes, whole grains, macaroni products from durum wheat, legumes. When the cell mass gets enough energy from the carbohydrates it helps maintain the basal metabolic rate and calorie intake by the body. Simple carbohydrates (sugars) are contained in sweets, juices, honey, fruits. You should eat them only as an addition to complex carbohydrates, in limited quantities.

*Observed value: 34.2 kg (Normal range: 26.9 - 43.3 kg)*

**Proportion of cell mass** (%) Too low or too high percentage of body cell mass leads to esurience. Low percentage of cell mass can point to malnutrition.

*Observed value: 61.4 % (Normal range: 50.0 - 56.0 %)*

**Skeletal muscle mass** (kg) It is the measure of body's adaptive reserve.

*Observed value: 29.0 kg (Normal range: 20.7 - 25.8 kg)*

**The total liquid** (kg) Total body water includes intracellular and extracellular fluid.

*Observed value: 42.1 kg (Normal range: 38.4 - 43.0 kg)*

**Extracellular fluid** (kg) The part of the total body water. The fluid outside the cells (blood, lymph, spinal and synovial fluid).

*Observed value: 18.1 kg (Normal range: 12.8 - 19.6 kg)*

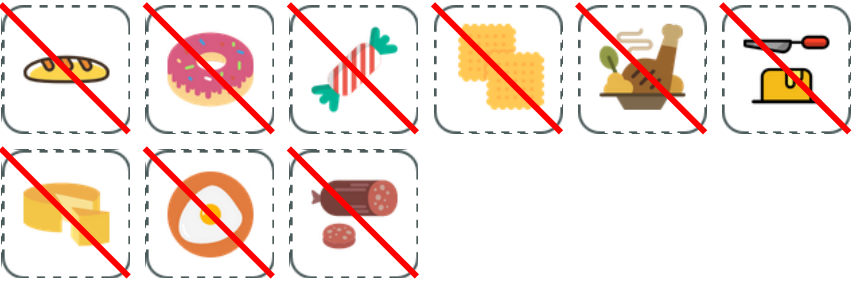

**Intracellular fluid** (kg) The part of the total body water. The fluid inside the human cells.

*Observed value: 24.0 kg (Normal range: 18.9 - 30.3 kg)*

**Basal metabolism** (kcal/day) This is the amount of energy required to sustain the body's vital functions while resting in a neutrally temperate environment when the digestive system is inactive. It reflects how much energy the body spends for the constant activity of the heart, kidneys, liver, breathing muscles and some other organs and tissues. The heat energy released during metabolism is spent on maintenance of the constancy of body temperature.

*Observed value: 1737.8 kcal/day (Normal range: 1338.5 - 1962.5 kcal/day)*

## Recommendations

<b>Diagnosis</b>	Overweight
<b>Main risks</b>	There is a high risk of cardiovascular diseases, varicose vein disease with further emergence of chronic venous insufficiency, gastrointestinal diseases (liver steatosis with further emergence of metabolic disturbances).
<b>Suggestion</b>	Splitting meals should be used (small frequent meals)
<b>Recommendations</b>	 <p>Physical activity should be gradually increased. It is necessary to restrict consumption of easily digested carbohydrates (sweets, cakes, pastries, candies, cookies excluding water crackers). Restriction of fatty kinds of meat (pork, lamb, beef), butter, hard cheese excluding white soft cheese (bryndza, Adygei cheese etc.). Restriction of yellow yolk consumption (1 egg per day or egg dishes without yellow yolk, for example, yolkless omelette). Consumption of high cholesterol foods (liver, brains, chicken skin, sausage products containing mechanically separated poultry meat) should be avoided.</p>
<b>Additionally</b>	<p>The duration of the dietary therapy is about (weeks) 20. Higher metabolic rate against the background of the increasing physical activity.</p> 

## Indices of heart rate variability

	Indicators of cardiac rhythm		Normal value	
HR	Heart Rate	73.2	60.0 - 85.0	bpm
mRR	Mean value of RR intervals	819	700 - 1000	ms
sdRR	Standart deviation	77.3	40.0 - 90.0	ms
RMSSD	The root mean square deviation of RR-intervals	61.5	30.0 - 65.0	ms
pNN50	The ratio of pairs of RR-intervals (>50 ms) to the number of all RR-intervals	● 35	2.0 - 30.0	%
VAR	The coefficient of variation	● 9.4	3 - 8	%
Mn	The minimum value of the length of the RR-interval	● 681	700 - 1000	ms
Mx	The maximum value of the length of the PR-interval	● 1045	700 - 1000	ms
MxDMn	The Difference Mx-Mn	● 364	150 - 300	ms
Mo	Mode	845	700 - 900	ms
Amo	Amplitude mode	● 27	30 - 50	%
SI	Stress index	● 43.9	50.0 - 200.0	conv.un.
TP	Total power	4395	2350 - 4550	ms <sup>2</sup>
ULF	Power in excess of low-frequency domain HRV spectrum		200 - 310	ms <sup>2</sup>
VLF	Very low frequency power for the domain of HRV spectrum	921	355 - 1175	ms <sup>2</sup>
LF	Low-frequency power in domain HRV spectrum	1015	754 - 1586	ms <sup>2</sup>
HF	The power of a high frequency domain HRV spectrum	● 2459	772 - 1178	ms <sup>2</sup>
LF/HF	The power ratio of the low - and high-frequency domains	● 0.4	0.5 - 2.0	conv.un.
VLFmx	The maximum power of the waves range VLF	60.5	-	ms <sup>2</sup>
LFmx	The maximum power of the waves range LF	26.6	-	ms <sup>2</sup>
HFmx	The maximum power of the waves range HF	35.2	-	ms <sup>2</sup>
VLFav	The average power of the waves range VLF	83.7	-	ms <sup>2</sup>
LFav	The average power of the waves range LF	30.8	-	ms <sup>2</sup>
HFav	The average power of the waves range HF	32.4	-	ms <sup>2</sup>
(LF/HF)av	The ratio of average values of low and high frequency component of HRV	1.0	-	conv.un.
VLFt	The dominant period component VLF	149.6	-	sec
LFt	The dominant period component LF	7.1	-	sec
Hft	The dominant period component HF	3.4	-	sec
VLF%	The relative value of the power of the waves range VLF	21	17 - 40	%
LF%	The relative value of the power of the waves range LF	● 23	24 - 43	%
HF%	The relative value of the power of the waves range HF	● 56	21 - 51	%
HFnu	The relative value of the power of the waves range HF in normalized units	● 70.8	40 - 59	n. u.
LFnu	The relative value of the power of the waves range LF in normalized units	● 29.2	41 - 60	n. u.
(LF/HF)nu	The ratio of LFnu to Hfnu	● 0.4	0.9 - 3.0	conv.un.
IC	The index of centralization	● 0.8	0.9 - 3.0	conv.un.
ISCA	The index activation of subcortical nerve centers	0.4	0.3 - 1.5	conv.un.
VB	The index of autonomic balance	● 0.4	0.6 - 2.0	conv.un.
IARS	The activity index of regulatory systems (IARS)	● 4	0 - 2	conv.un.

### Conclusion:

Normocardia. Mild sinus arrhythmia. Moderate predominance of the parasympathetic nervous system. A moderate weakening of the activity of subcortical nerve centers. State regulatory systems: moderate functional voltage activation of cholinergic regulation link. A high level of resilience. High level mobilizing potential. A moderate level of hormonal modulation of regulatory mechanisms. Adaptive capacity of the organism significantly increased (condition excessive response giperhilii requiring a rebalancing of power consumption).



### Functional status

0		Optimal level of regulation	Normality
1		Normal level of regulation	
2		Moderate functional stress	
3		<b>Expressed functional stress</b>	<b>Functional stress</b>
4		Pronounced functional stress	
5		Overstrain of regulatory mechanisms	Overexertion
6		Pronounced overstrain of regulatory mechanisms	
7		Depletion of regulatory systems	Depletion of regulatory systems and stress-adaptation failure
8		Pronounced depletion of regulatory systems	
9		Failure mechanisms of regulation	



The normal adaptation level. The autonomic regulation is low. The normal energy supply of the body. The psycho-emotional state is good. Health status is normal.

## Explanations corresponding to the calculated values

**Normocardia** is a normal resting heart rate between 60 and 90 beats/min

**Mild sinus arrhythmia** is not a particular disease, but sometimes it can be a sign of the nervous system dysregulation. A human heart normally has a regular rhythm at a rate of approximately 60-90 beats per minute at rest, but from time to time a healthy person can have a mild irregularity of the rhythm. Normal rhythm is also called a sinus rhythm, since the sinus node, situated in the right atrium, normally controls the heart rhythm by producing electrical impulses that initiate each heartbeat. Normally the time difference between heart beats should not exceed 10%.

*Respiratory sinus arrhythmia* is commonly found, when the heart rate increases during inspiration and decreases during expiration. It is caused by influence on the heart of so-called vagus nerve which activity increases during inspiration.

*Mild sinus arrhythmia can be provoked by:*

- pregnancy due changes of autonomic nervous system during that period (i. e. nervous regulation of internal organs, endocrine glands and vessels);
- consuming coffee, green and black tea, alcohol;
- smoking;

*Cases when sinus arrhythmia can be dangerous:*

As usual, mild sinus arrhythmia is not accompanied by any symptoms. It is not a dangerous condition, but it requires readjustment of the disturbed body balance.

**Mild predominance of parasympathetic nervous system** means that balance is shifted to decreased body activity. Apathy, easy fatigability, decrease in arterial blood pressure and performance impairment occur, heart rate slows down. Headache and insomnia are also possible signs. The predominance of parasympathetic nervous system can be a normal condition in trained professional athletes.

*The possible causes:*

- chronic sleep deprivation;
- jet lag (the stress of frequently changing time zones);
- hormonal alterations (during puberty, pregnancy, climacteric phase);
- intoxication or infection;
- chronic diseases exhausting body resources;
- endocrine disorders (thyroid, adrenal and sex glands disorders);
- nervous system dysregulation (for example, vegetovascular dysfunction).

*Cases when this condition can be dangerous:*

- Menstrual disorders and sexual dysfunction (low libido) can occur.
- The performance impairment can lead to overuse of caffeine (it can be found in coffee, green and black tea, some carbonated soft drinks, energy drinks), alcohol and other psychostimulants and creating an addiction. However effect of psychostimulants usually of short duration and then the body condition gets worse.

**Mild activity reduction of subcortical nervous centers** may not threaten human health but, when combined with other adverse symptoms, it can point to the disease state or be a prodrome (an early symptom indicating the onset of a disease) of different diseases.

High nervous centers of brain cortex are responsible for the nervous regulation of the body in general as well as for the body interaction with the environment. The subcortical nervous centers provide the balance of the different body systems (cardiovascular, respiratory systems etc.). The signals from these centers to organs intensify or inhibit their activity. For example, decrease in activity of the cardiovascular center slows down the heart rate.

*The following conditions and illnesses are possible causes:*

- different chronic diseases;
- long-term stress;
- long-term intake of psychostimulants (alcohol, caffeine and others) exhausts nervous system and leads to decrease in excitability of subcortical centers.

**Moderate functional stress** means that the organism works actively. If the **activation of cholinergic division** of the autonomic nervous system occurs, probably, there is lack of energy required for the body activity, so the organism tries to save resources.

The sympathetic nervous system is one of the two divisions of the autonomic nervous system (ANS), the other being the parasympathetic nervous system. The autonomic nervous system controls most of the body's internal organs, endocrine glands and blood vessels.

So-called cholinergic division of ANS is parasympathetic division of the autonomic nervous system which controls restitution and relaxation. Therefore cholinergic mechanisms reduce the energy expenditure. They are responsible for maintenance of functional reserves and restoration of body resources.

*Cases when this condition can be dangerous:*

Moderate functional stress is a normal body condition. However activation of cholinergic mechanisms (it points to low energy level) increases the risk of functional reserve reduction.

**Body adaptive capability** is an ability of the organism to constantly adapt to the changes of internal and external environment. Decrease in adaptive capability leads to the low level of functional reserves which spent on balance maintenance. Severe body imbalance can lead to different diseases.

**High level of restoration potential** means that the organism does not much time to restore its functional reserves. Usually it is true for young organism and/or the physically trained person.

Every person has so-called body functional reserves (reserve energy) which constantly spent on optimal balance maintenance. In case of reduction of functional reserves, for various reasons, it is necessary to restore energy resources.

**High level of mobilizing potential** reflects that the organism can easily mobilize internal reserves and restore them fast.

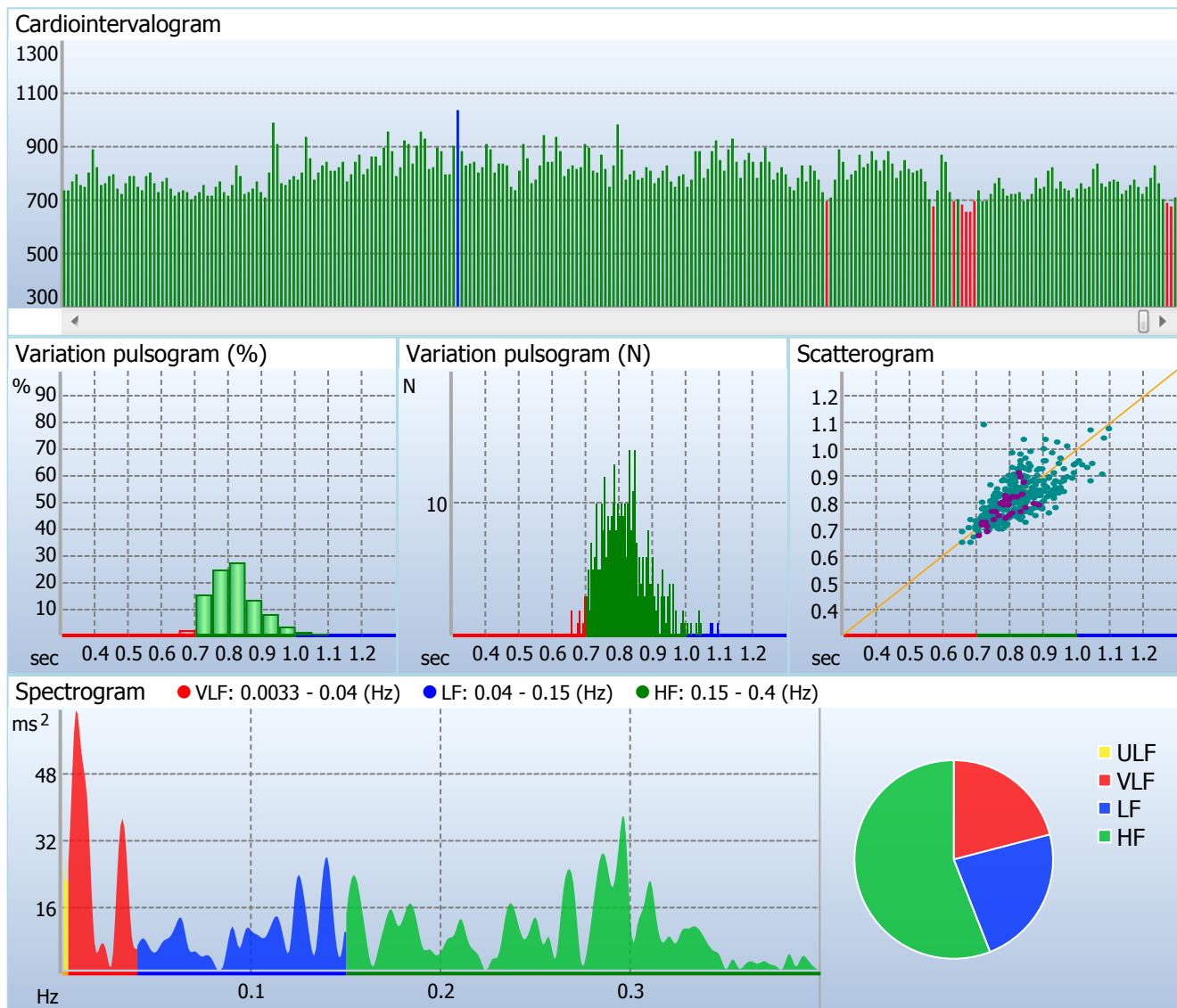
The organism constantly adapts to the changes of internal or external environment. When there is an additional load (stress) it is required to use (mobilize) so-called functional reserves, i. e. increase energy expenditure. The high level of body functional capabilities relates to the slight stress of regulatory systems.

**Average level of hormonal modulation of regulatory mechanisms** points to the moderate involvement of hormones in the nervous regulation. Hormones are essential body resources so the hormone involvement means that the nervous system does not work enough well.

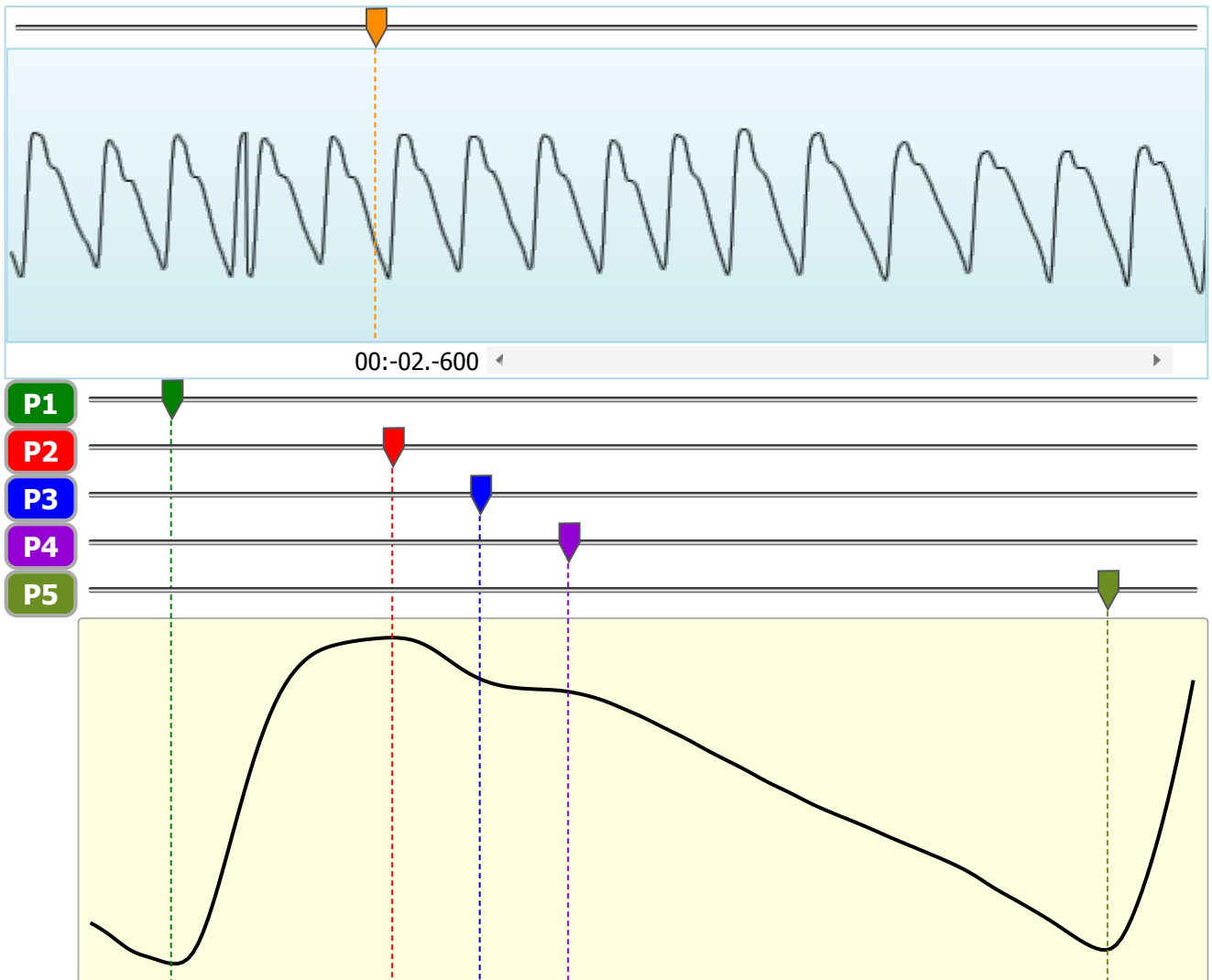
The organism adapts to the changes of internal or external environment by nervous system with the involvement of hormones produced by endocrine glands. For example, adrenal glands produce stress hormone adrenaline, thyroid produces thyroid hormones etc.

Average level of hormonal modulation of regulatory mechanisms relates to the slight depletion of the body functional reserves which constantly spent on balance maintenance. Average level of hormonal modulation can points to the condition close to the overstrain.

# Graphical view of heart rate variability



## Photoplethysmogram



Photoplethysmogram parameters			Normal value	
APW	Amplitude of Pulse Wave	0.96		conv.un.
ADW	Amplitude of Dicrotic Wave	0.76	0.48	conv.un.
HI	Height of Incisura	0.80	0.64	conv.un.
IDW	Index of Dicrotic Wave	● 83	60 - 75	%
DAP	Duration of Anacrotic Phase of pulse wave	300		ms
DDP	Duration of Dicrotic Phase of Pulse Wave	610		ms
DPW	Duration of Pulse Wave	910	700 - 1000	ms
IAW	Index of Anacrotic Wave	23	15 - 30	%
DF	Duration of Filling	● 215	60 - 200	ms
DS	Duration of the systolic phase of cardiac cycle	385	350 - 550	ms
DD	Duration of the diastolic phase of cardiac cycle	525	400 - 600	ms
DBW	Duration of Backward Wave	● 170	200 - 400	ms
IS	Index of Stiffness	● 10.0	5 - 9	1/s
IBW	Index of Backward Wave	● 79	40 - 70	%
HR	Heart Rate	65	60.0 - 85.0	bpm

**Conclusion:**

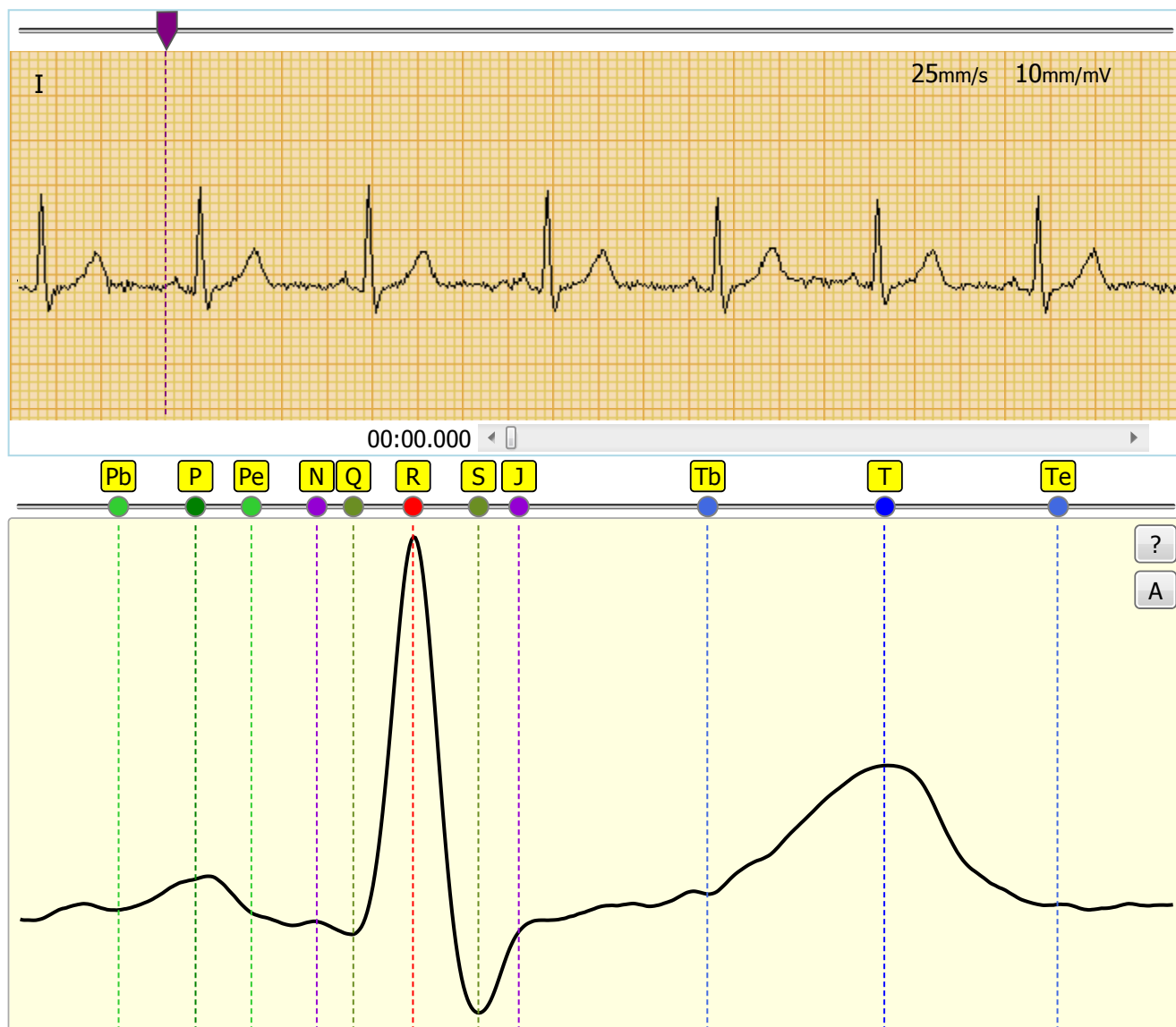
*Index of Stiffness.* It reflects the stiffness of arterial wall to the pulse volume. Standard values averaged about 5 - 9

*Observed value:* 10.0 1/s

*Index of Backward Wave.* It corresponds to the value of backward wave. It mainly reflects the tone of arterioles and minute vessels, indirectly indicates presence of atherosclerotic lesions (increase of atherosclerotic lesions). Standard values vary 40 - 70%.

*Observed value:* 79.0 %

## ECG contour analysis



Electrocardiogram parameters		Normal value	
Pulse rate	72	60.0 - 85.0	bpm
Mean duration of RR interval	822	700 - 1000	ms
Minimum duration of RR interval	716	700 - 1000	ms
Maximum duration of RR interval	● 1020	700 - 1000	ms
Electrical axis of the heart	34	0 - 90	deg
Wave P duration	68	< 110	ms
Wave P amplitude	0.08	< 0.2	mV
Duration of PQ interval	102	< 210	ms
Macruz index	● 2.0	1.1 - 1.6	conv.un.
Wave Q duration	27	< 40	ms
Wave Q amplitude	0.04	< 0.23	mV
Duration of QRS complex	● 105	60 - 100	ms
Wave R amplitude	1.02	0.5 - 1.5	mV
Wave S amplitude	0.21	< 0.5	mV
Deviation of the beginning of ST segment (J)	-0.03	-0.05 - 0.1	mV
Duration of ST segment	97	-	ms
Deviation of ST segment (J+60)	0.08	-	mV

Wave T duration	182	-	ms
Wave T amplitude	0.36	-	mV
Duration of QT interval	● 385	< 376	ms
Corrected value of QT interval	● 0.44	< 0.42	conv.un.

### Conclusion:

Sinus rhythm, irregular. HR max = 83 bpm, HR min = 58 bpm. Normal heart axis.

Sinus rhythm is a normal rhythm.

*Macruz index.* Ratio of wave P duration to segment PQ duration is called Macruz Index. Normal value of Macruz Index is 1,1-1,6. This index is used in diagnosis of atrial hypertrophy.

*Observed value:* 2.0 conv.un.

*Duration of QRS complex.* QRS complex is a ventricular complex, that is registered during activation of the ventricles. This is a distance between the beginning of Q wave and the end of the S wave (N and J lines). The width of QRS complex indicates duration of intraventricular activation. Its normal value is 0.06–0.08 (up to 0.1) sec. The width of QRS complex decreases slightly with the heart rate increase and vice versa. QRS complex enlarges in bundle branch blocks, for example.

*Observed value:* 105.0 ms

*Duration of QT interval.* QT interval (electrical systole of the ventricles) is a time interval from the beginning of the QRS complex to the end of the T wave. QT interval duration depends on gender, age, heart rate. Normal QT interval shall not be more than 50% of the preceding RR interval. The possible cause of QT interval elongation is hypokalemia (hypocalcaemia), cause of QT interval shortening is hyperkalemia (hypercalcaemia).

























*Observed value:* 385.0 ms

*Corrected value of QT interval.* It is calculated upon the Bazett's formula:  $QTc = QT / \sqrt{RR}$ . QT interval is considered pathologic when its value exceeds 0.42.

*Observed value:* 0.4 conv.un.



### Risk analysis

	Low	Middle	High
Heart 	 17%		
Vessels 		 31%	
Central nervous system 		 33%	
Respiratory system 		 41%	
Digestive system 		 46%	
Urinary system 		 48%	
Reproductive system 		 45%	
Endocrine system 		 40%	
Musculoskeletal system 		 36%	
Lymphatic system 	 27%		
Immune system 		 31%	
Peripheral nervous system 		 48%	