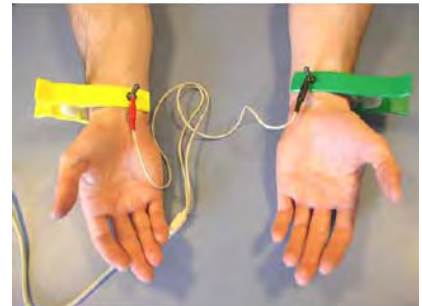


## Heart rate variability

Heart rate variability (HRV) is a measure of the beat-to-beat variations in heart rate. It is usually calculated by analyzing a time series of beat-to-beat intervals derived from an arterial pressure tracing HRV is regarded as an indicator of the activity of autonomic regulation of circulatory function.

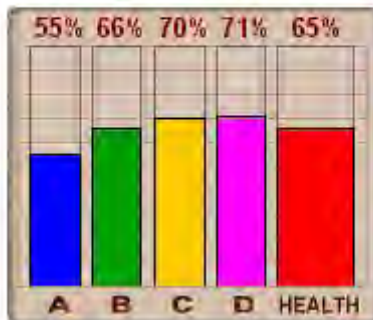
Its value is in relation to the Autonomic Nervous System, which has a significant responsibility in response and modulation of activity. HRV can identify the strength, reserves and balance. It is a good indication of the effects of stress and the withstand ability that we have to cope with stress.

It is a five minute measurement taken on both wrists by clamp on conductors.



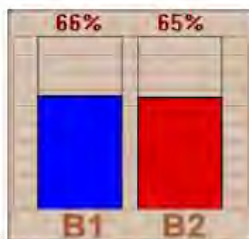
## The Core Measurements

This diagram shows normalized values of index of a physical state.



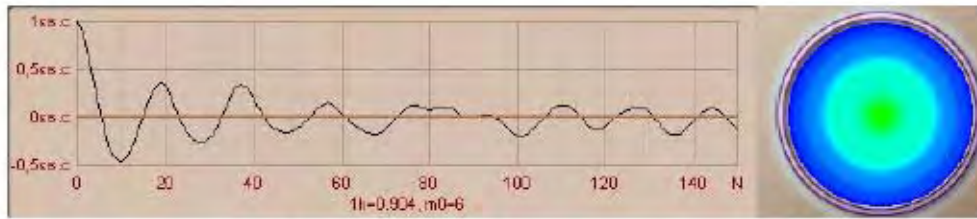
- A** – adaptation level of cardiovascular system
- B** – index of a vegetative regulation
- C** – index of a central regulation
- D** – psycho-emotional state
- Health** – integral index of a functional state

### 4. "VR indices"

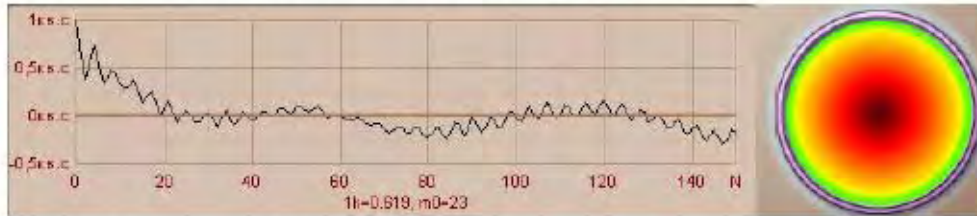


This diagram shows normalized values of the integral indices of a vegetative regulation:

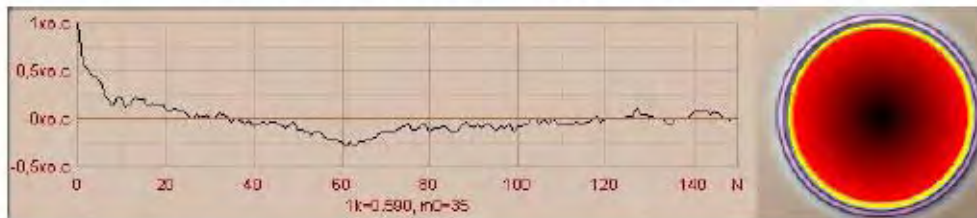
- B1** – regulation level
- B2** – regulation resources



A – Predominance of the independent regulation contour



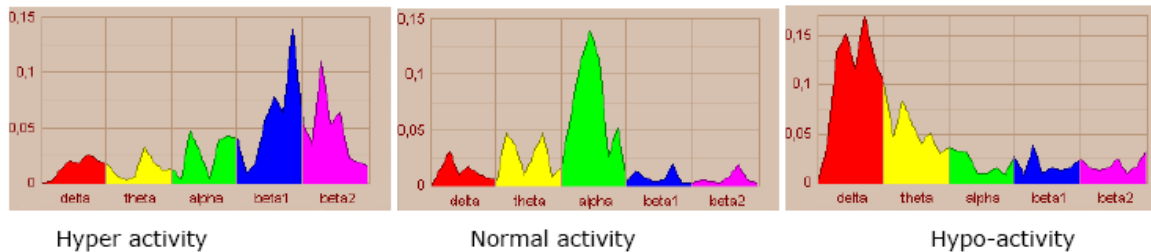
B - Predominance of the central regulation contour



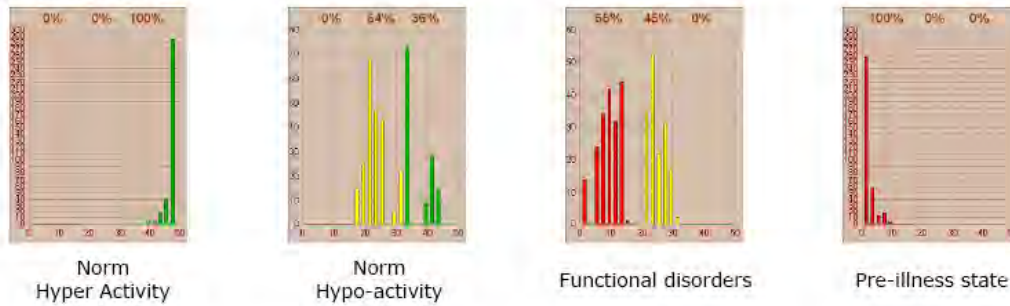
C – Pathologic regulation

## 2. Frequency spectrum.

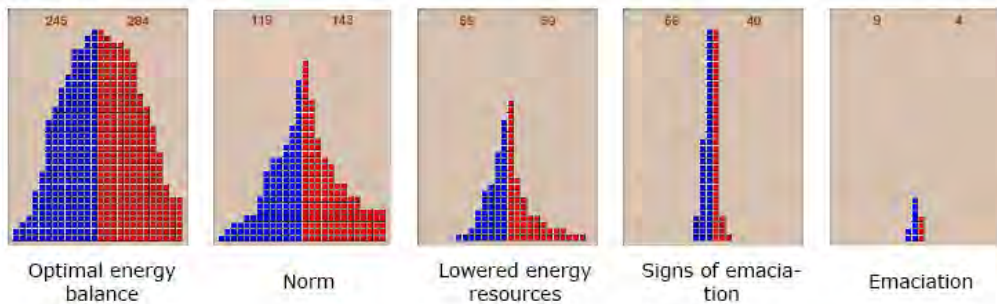
The spectral power is calculated for gamut a delta, theta, alpha, beta1- and beta2- rhythms.



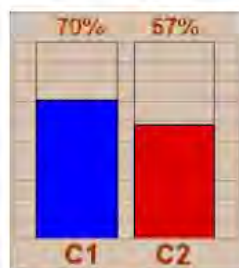
3. The "Codes Histogram" window represents the distribution of neurodynamic codes according to the degree of their structural failure. In the red field there are codes with defective structure, in the yellow field there are codes with modified structure, in the green area are the codes, whose structure corresponds to the normal functioning of the body.



4. The "Energy Pyramid" window – the dynamic display of the energy balance in different control systems of the body. The correlation between the right and left parts of the pyramid characterizes the dynamics of anabolic and catabolic processes – the left part corresponds to the accumulation period, while the right one corresponds to the consumption period by different organs and systems of the organism. The energy pyramid is characterized by the following indices: the anabolism index, the energetic resource, the energetic balance, the catabolism index. Examples of "energy pyramids" corresponding to different states of the organism are shown in the picture below.



5. The "CR Diagram" window



This diagram represents the normalized values of integral indices of the central regulation:

- C1** – compensation level
- C2** – compensation resources

## **The Autonomic Nervous System**

The autonomic nervous system (ANS or visceral nervous system) is the part of the peripheral nervous system that acts as a control system functioning largely below the level of consciousness, and controls visceral functions. The ANS affects heart rate, digestion, respiration rate, salivation, perspiration, diameter of the pupils, micturition (urination), and sexual arousal. Whereas most of its actions are involuntary, some, such as breathing, work in tandem with the conscious mind. It is classically divided into two subsystems: the parasympathetic nervous system and sympathetic nervous system

Sympathetic and parasympathetic divisions typically function in opposition to each other. But this opposition is better termed complementary in nature rather than antagonistic. For an analogy, one may think of the sympathetic division as the accelerator and the parasympathetic division as the brake. The sympathetic division typically functions in actions requiring quick responses. The parasympathetic division functions with actions that do not require immediate reaction. Consider sympathetic as "fight or flight" and parasympathetic as "rest and digest".

However, many instances of sympathetic and parasympathetic activity cannot be ascribed to "fight" or "rest" situations. For example, standing up from a reclining or sitting position would entail an unsustainable drop in blood pressure if not for a compensatory increase in the arterial sympathetic tonus. Another example is the constant, second to second modulation of heart rate by sympathetic and parasympathetic influences, as a function of the respiratory cycles. More generally, these two systems should be seen as permanently modulating vital functions, in usually antagonistic fashion, to achieve homeostasis. Some typical actions of the sympathetic and parasympathetic systems are listed below