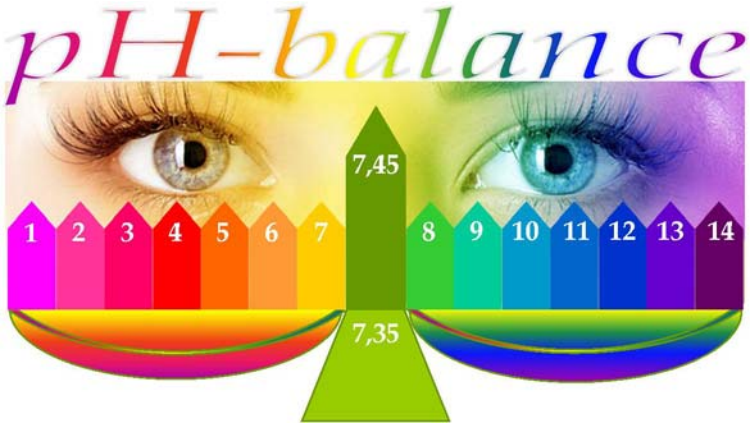

Chapter 11:

THE ACID-BASE BALANCE for good metabolism

Our life is due to the balanced interaction of the two streams of Life Energy - the potentiating force of Yin and the realizing active force Yang. *(p.22,94)* In our body these two energy forces ineract through acid-forming reactions, corresponding to the potential of Yin-Energy, and alkaline-forming reactions, corresponding to the power of Yang-Energy to balance reactions and neutralize acids. *(p.44,45)* Depending on the strength with which these reactions take place, body fluids in certain organs, tissues and cells, or at a certain time, have different degrees of acidity and alkalinity. This degree is measured by a 7-point scale in alkaline and acidic environments, also corresponding to the seven types of energies *(pp. 13,51,157)* flowing through our being on a physical, spiritual and mental level. Therefore, our mental and spiritual manifestations also have their physical expression, not only causing different physical and psychical sensations, but also having a direct impact on the biochemical balance in our body. *(p.15,20-21,36,63-65)*

It is important to know that for the course of our Life, the end result of this interaction must be the continuous maintenance of an absolutely neutral and balanced vital environment, with a pH between 7.35 and 7.45. *(p.68)*

Definition of pH

pH or "potential hydrogen (H +)" is a unit of measurement for the concentration of free hydrogen ions in liquids, determining them as **acidic** (*ready to react, potentiate and cause reactions*), **neutral** (*ready to maintain the balance between acidic and alkaline reactions*) or **alkaline** (*ready to neutralize acids, but also to activate, "eliminate or crystallize" reactions*). *(p.19,22,31,45,60)*

The pH is measured on a scale from 0 to 14, and values between 7.35 and 7.45 are neutral - neither acidic nor alkaline. The closer the pH of a liquid is to 14, the more it is defined as an alkaline (basic) medium - high pH, and vice versa, the lower the pH below 7, the more acidic the medium is.

pH can only be measured in fluids, and in the body it is measured, through body fluids *(p. 112)* and blood, which contains about 92% water.

In food, pH is measured by the water and juices it contains, and their pH potential (the release or binding of hydrogen ions in the body) during digestion is decisive. *(p.127,132,168-169)*

The physical expression of the alkaline-acid balance in our body, in practice, measures our potential to generate, terminate and balance the causal relationships in Life, *(p.11,27,93)* but also to resist, ie. our ability to realize the cause and the effect Now. *(p.85,155,191)*

The alkaline-acid balance in our body and the physiological reactions that support it, correspond to the right-proportional to our conscious or unconscious thoughts, decisions and actions. *(p.51,56-58,76,128,190,192)* On the other hand, the alkaline-acid status of our body fluids can determine our good mood, acidity, apathy or aggression. *(p.112,148,149)* When a reaction with a particularly strong acid charge is caused in our body, in order to be neutralized to the vital level of cellular functionality, it is necessary to excite just as strong an alkalizing reaction, and vice versa. Our body is a unique organism in which the two energy flows Yin and Yang, acidic and alkaline environment, complement and balance each other to manifest and sustain our Life. Due to the metabolism of nutrients, our bodies synthesize and excrete large amounts of acids and bicarbonates, which we neutralize through the respiratory chain, exhaling over 1 kg of carbon dioxide per day. *(p.78,168,169,186)*

Table 17: pH of body fluids in various cells and organs of our body:			
stomach acid	1 - 3	cellular fluids	7,2
cellular lysosomes	4,5	***blood***	***7,35 - 7,45***
neuroendocrine cells	5,5	saliva	6,2 - 7,4
epidermis / skin	5,5	cell nucleus	7,5
urine	6	cerebrospinal fluid	7,5
colon	5,5 - 7	bile juices	7,5-8,05
gallbladder	6,8 - 7,65	pancreatic juices	8,1

Blood pH

The pH of the blood varies in a very narrow range - between 7.35 to 7.45 – this means, neutral to slightly alkaline pH. If the pH of our blood deviates, even slightly from these limits, we become ill or have symptoms of nausea. If the pH of the blood falls below 6.8 or rises above 7.8, irreversible damage and denaturation of proteins occur, the cells in the body stop functioning, which is beyond the limits of life. The food we eat, our motor regime, as well as our mental state, can play an important role in increasing or decreasing body pH. Therefore, we need to be extremely careful before deciding whether to deliberately intervene and what measures to take in regulating this process.

Acidic blood and alkaline blood are magnets for a number of health ailments and diseases, predisposing the body to aging and weakening the immune system. Increased excretion and retention of acids in our body can lead to acidosis, and increased retention of bicarbonate - to alkalosis.

Acid-forming processes generate acids in the blood (acidosis), and alkaline-forming processes generate alkalis in the blood (alkalosis). The states of alkalosis and acidosis are mutually induced or complementary to balance the pH of the blood, similar to the vital energies of Yin and Yang. *(p.74)*

To maintain the vital pH balance of the blood in "extreme" conditions, the body compensates for the manifestations of alkalosis or acidosis at the expense of the pH of cellular fluids, which may lead to cellular imbalance or damage to normal organ structure and function. *(p.15,17,55,61,68,102,112,131-132,143)*

The systemic chronic manifestation of conditions
such as alkalosis or acidosis, is pathogenic.

Such manifestations can irreversibly disrupt the proper metabolism. This in turn leads to health consequences, damaging the liver, bile, kidneys, cardiovascular system, insulin regulation and other vital processes in the body.

The frequent states of discomfort, headache, decreased tone, physical and mental malaise, are in fact consequences of the frequent change of the alkaline-acid status of body fluids. Of course, such conditions are caused primarily by our unreasonable actions or inactions, such as irregular and sedentary lifestyle, unbalanced emotionality or diet, physical or psychical exhaustion. ***(p.33,163,165)***

When we decide to soothe subsequent unpleasant symptoms with medications or substances that affect the pH balance, due to our impatience or ignorance of how to manage our imbalance and malaise, we can cause a risk of metabolic disorders, and even a condition such as metabolic syndrome, with a cyclic transition from alkalosis to acidosis. *(p.36,40,46,54,55)*

In short, what provokes acid-forming processes?

Consumption of meat without sufficient import of alkalizing salads and fiber; destructive emotions such as grief, anger, envy; grueling diets for fast weight loss; excessive physical activity without pre- and post-training of the muscles and without sufficient intake of minerals and trace elements; renal or pulmonary energy deficiency, etc. *(p.75,76)*

And what - alkalizing processes?

Conditions of depression, regular alcohol intake, baking soda, confectionery, lack of exercise and sedentary lifestyle, overweight, stagnation of spleen energy, insufficient fluid and water intake, etc. *(p.75 , 76,121)*

How does our body maintain its vital pH?
And how does it manage to balance
the life-threatening consequences of our unreasonable actions?

Natural processes of regulation of pH of body fluids:

The body regulates its pH by maintaining a constant balance between physiological processes, such as the functions of cellular metabolism and *the organs involved in the **respiratory chain**:*

• **through renal function**, *(p.53,56,58,63,74,127,95,169,182)* which excretes through the urine excess bicarbonate from the neutralization of acids, in case of increase (alkalization) of blood pH, and vice versa - reabsorbs bicarbonate in case of lowering the pH (acidification),

• **through lung function**, *(p.45,135,173,186)* which neutralizes acids, converting them into water (H_2O) and carbon dioxide (CO_2). Carbon dioxide is expelled with the help of hemoglobin, in case of lowering the pH (acidification). For example, forced breathing alkalizes the blood, and slow breathing with air retention causes the opposite reaction - it neutralizes the alkalizing bicarbonates (HCO_3^-) by re-synthesis of carbonic acid (H_2CO_3).

The participation of the kidneys and lungs in maintaining the alkaline-acid balance in the body is carried out with the help of a group of buffering agents, supporting the body respiratory chain at celular level:

• **through hemoglobin**, which plays an important role in maintaining normal pH in the blood, by neutralizing excess free hydrogen ions, that acidify the blood, by transporting oxygen to the cells, water formation and exhalation of carbon dioxide. *(p.45,53,92,132,135-137)*

• **through bicarbonates** (HCO_3-), which are **naturally secreted** by the gallbladder, liver, stomach and pancreatic cells - during and especially after meals. By the bicarbonates **that are formed during the neutralization of carbonic acid**, by inhaled oxygen, or by the direct hydration of carbon dioxide with water in the blood, by means of the enzyme carbonic anhydrase. *(p.108-111,125-128,168-169)*

• **through carbonic acid** (H_2CO_3), which is formed during the neutralization of strong acids from protein metabolism, or during the anaerobic synthesis of lactate from carbohydrates. *(p.44-45,56,78)* Strong acids bind to bicarbonates to form carbonic acid, which **breaks down into bicarbonates when the cells are charged with oxygen, releasing reactive hydrogen ions, which re-acidify the blood**. Excess hydrogen ions are neutralized by hemoglobin, on exhalation, by re-synthesis of carbonic acid and its decomposition into water and exhaled carbon dioxide. *(p.186)*

• **through glutamine**, which neutralizes high acidity due to protein metabolism and muscle activity, binding to free hydrogen ions and forming strongly alkaline ammonia. **The liver converts ammonia to the less alkaline and non-toxic urea**, which is excreted in the urine through the kidneys. During this process, two bicarbonate molecules are released to further neutralize the acids. *(p.31,52,56,63-65,77,95-99,104-106)*

• through **phosphates and minerals,** *(p. 51,76,77,129)* which also play an important role in regulating the pH in tissues and cells, and hence in the blood. In the presence of respiratory alkalosis (due to rapid and superficial breathing - *see below*) phosphates are absorbed from the blood into the cells, causing a process of glycolysis (breakdown of glucose), producing energy. With the help of the adenosine triphosphate thus formed (the energy "currency" for cellular exchange), carbon dioxide is removed from the cells, thus normalizing the pH in the blood. In a similar way, electrolytes and trace elements such as calcium, potassium, magnesium and zinc also play a role in normalizing pH, but at the cost of their depletion. *(p.29,42,44,51,57,63,77,79)*

• **through uric acid**, formed during the metabolism of purines in proteins (chicken, pork, seafood, beans, peas, yeast, beer), which also plays a balancing role in maintaining the alkaline-acid balance. In alkalizing diets, uric acid is excreted in the urine, and in acid-forming diets it is retained in the blood, providing balancing and antioxidant protection, similar to that of vitamin C. *(p. 62,78,127,190)*

Table 18: Our body is able to compensate for the conditions of alkalosis and acidosis in a timely manner in order to maintain the vital pH balance in the blood:

Imbalance:	pH	CO2	Compensation:
METABOLIC ALKALOSIS (in case of dehydration of the body, increased intake of diuretics and alkalizing agents)	High	High	**Respiratory acidosis** - by slow breathing, to the formation of carbonic acid, by the binding of carbon dioxide to water molecules in the blood.
RESPIRATORY ALKALOSIS (with intensive oxygen inhalation)	High	Low	**Renal acidosis** - by excretion of excess bicarbonate in the urine, and decreased: secretion of hydrogen ions, glutamine and ammonia excretion.
METABOLIC ACIDOSIS (due to the metabolism of acid-forming substances)	Low	Low	**Respiratory alkalosis** - through intense respiration to the oxidation of carbonic acid, and its decomposition into bicarbonates and free hydrogen ions.
RESPIRATORY ACIDOSIS (for superficial breathing, lack of oxygen, or deep breathing with air retention)	Low	High	**Renal alkalosis** - by reabsorption and retention of bicarbonates, by secretion of hydrogen ions, which bind to glutamine and form alkalizing ammonia.

These processes of slight change in the alkaline-acid status of blood and body fluids occur in the course of the natural activity of organs and cellular exchange: respiration, digestion, metabolism, redox processes, movement and muscle activity, excretion, detoxification of waste substances, brain activity, etc. *(p.43-45,52,61,64-65,66)*

It is clear that **proper, rhythmic and calm inhalation and exhalation of air** plays an important role in maintaining a good alkaline-acid balance. Proper respiration and breathing techniques can not only balance the reactivity of body fluids, but also eliminate anxiety, worry and excess stomach acidity. *(p.1,35,69,132,186)*

Conditions of increased blood alkalinity are observed after intense sweating, vomiting and loss of fluid in the urine (metabolic alkalosis), with rapid breathing and intensive loading of the lungs with oxygen (respiratory alkalosis).

Conditions of increased acidity of the blood are observed due to digestion and metabolism of proteins and carbohydrates (metabolic acidosis), deep breathing with air retention, in conditions of insufficient oxygen - hypoxia (respiratory acidosis).

Acid-forming diets will stimulate the body to produce and reabsorb more alkalizing bicarbonates, causing constipation, but will also maintain the pH-balancing uric acid.

Alkalizing diets will stimulate the production of acids (especially lactic acid), at the expense of the elimination of alkalizing uric acid.

The longer and more intense the alkalizing processes, the stronger and more intense are the acid-forming reactions that neutralize them, and vice versa, the stronger the acids generated in the body, the more intense are their alkalizing reactions. *(p.127 -130)*

A good pH balance requires:

- enough **oxygen for the lungs**, *(p.135-138,186)*
- enough **water and electrolytes for the kidneys**, *(p.51,95-100)*
- complete **food for the stomach and liver**, *(p.104,125,158,165)*
- sufficient **movement for the spleen and brain activity**, *(p.69,121-124,187)*
- enough **sleep for the heart**. *(p.114-120)*

pH Imbalance

Systemic manifestations of acidosis and alkalosis, especially due to irregular lifestyle, dietary errors, medication, bad habits, reduce the ability of the intestinal flora, kidneys and liver, to absorb minerals, vitamins and nutrients, disrupt good digestion, reduce production of energy in the cells, disrupt the ability of DNA to regenerate damaged cells and tissues, limit the body's ability to naturally detoxify. *(p.51,63,76,85,128,143,165)*

The consequences of chronic alkalosis can cause chronic acidosis, and vice versa - the consequences of chronic acidosis can cause chronic conditions of alkalosis.

Mixed states of metabolic and respiratory acidosis and alkalosis are often observed in cases of irregular lifestyle and unbalanced diet. Such an unfavorable cyclicity is clearly expressed in the metabolic syndrome, *(p. 47-48,57-58)* but not without the "**kind assistance" of the "emotional hormones**". *(p.32-36)*