

**SKELETON OF THE MICROCIRCULATION**

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Structure of connective tissue or skeleton of microcirculation is presented by rings of dense connective tissue around the main microvessels and their large branches. From the rings of the outline network branch the trabecules with terminal arterioles and collecting venules, towards the network of the metabolic microvessels. They branch, thin and disperse into loose connective tissue in alveoles, surrounded by capillaries. The alveoles of the metabolic network are filled with dense network of thin and differently directed fibers of connective tissue and hydrophilic amorphous substance; they form the walls of the tissue channels. Skeleton of microcirculation, besides its supporting function, can also act as an external cuff for the metabolic microvessels and tissue channels: limit the «spreading» of the tissue fluid from the alveoles of the metabolic network and direct its current from the tissue channels into the metabolic microvessels with different wall permeability. Apparently, the microcirculation has a modeling effect on stroma's fibro-architectonics in its area, till the inclusion of the differentiating connective tissue into the vessel wall. Histo- and morphogenesis of the microcirculatory soft skeleton at different levels of its organization resembles a transition of the bone tissue from fibrous to lamellar, spongy and compact.

The work was submitted to international scientific conference «Fundamental research», Croatia, July 25 – August 1, 2009. Came to the editorial office on 10.09.2009.

**DEVELOPMENT OF THE THYMUS AND SPLEEN**

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Lymphatic channels and lymphoid structures cooperate with each other to provide hemostasis in the body. This is indetermined by their set up in close association with veins. Lymphatic channels differentiate as a collateral part of the venous bed excluded from the blood flow. Spleen and thymus lie off the transport conduits that carry lymph, as well as the red bone marrow. Unlike the other lymphoid structures, they do not participate in lymph drainage from other organs; and in the process of evolution and ontogenesis, they form together with the predecessors of the lymph vessels – venous sinuses. Lymphatic «instability» of thymus, spleen and the red bone marrow is their typical feature from the moment of their formation, when

mesenchymal cells cluster around venous sinuses, where the blood flow slows down and the blood gets a better contact with the perivascular tissue. The rest lymphoid structures originate in association with lymphatic sacs or vessels. Their forerunners are the merging lymphatic clefts, which appear from the pockets, separated from the primary veins. Lymphocytes begin to colonize a lymphoid organ after peripheral lymph collectors have been formed – interclef membranes collapse, and decay products of other structures (antigens) get inside.

The work was submitted to international scientific conference «Medical, social and economic problems of population health preservation», Turkey, May 20-27, 2009. Came to the editorial office on 10.09.2009.

**THE VASCULAR BED DEVELOPMENT PHYSIOLOGY**

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The vascular bed development is begun just from the endothelial primordia proliferation and also the embryo protocapillary network formation. Its irregular growth and the differentiation, including the magistralization and the reduction are taken their place by the increasing pressures gradient, in connection with the organs' growth and the histogenesis: 1) the centrifugal magistralization (e.g. just from the heart to the organs) by the shortest way; 2) the arteries in their development are outgrown the veins; 3) the great vessels are divided just into the branches to the multiple organs and their parts; 4) the anastomoses (but to be more specific – the magistralization) formation among the branches of one and the various magistral. The vessels development is, practically, defined by the blood flow and the homotissue metabolism correlation. The metabolites transmural diffusion currents are exerted their «washing» effect upon the endothelium and also the subendothelial layer of the connecting paratenons, they disjoin the cells' and the molecules' contacts, that is inhibited the collagenous fibers morphogenesis, this is stimulated the capillaries growth and the neoplasms. The diffusion is, rapidly, become extinct just in the thickening and callous vessel's wall, the blood pressure mechanical constituent just on the wall is kept in its thickness. The metabolic currents are considered by me, as the growth inductor and the microvessels branchings, the hemodynamic factor – as their magistralization inductor. The lymphatic capillaries, «having non – functioned» the heart, which is the main blood flow motor, and the arterial bed, are kept the «embryonic» structure (e.g. the thin endothelium just without the basilar membrane), in contrast to the blood capillaries.

The work was submitted to international scientific conference «Medical, social and economic problems of population health preservation», Turkey, May 20-27, 2009. Came to the editorial office on 09.2009.

**BIOTECHNICAL SYSTEM OF CAR GAME TRAINING BASED ON USE OF A MULTIPARAMETRICAL FEEDBACK AND SUBSENSITIVITY LIGHT SIGNALS OF CONTROL**

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**Research urgency**

Development of modern hardware promoted creation of the unique medical-rehabilitation technology allowing more effectively to be trained ways of self-control. It is a question of computer game bio-management. The computer game training apparatus includes some the game plots having obvious or latent competitive character. The competition course is regulated by dynamics of the registered physiological parameter: it can be a pulse rate, skin temperature, dermo-galvanic reaction. Win competition the patient can in the event that will learn to operate the physiological function in a situation of virtual competitive stress. The colourful game plots created with use of modern multimedia means, raise motivation training, promote more effective fastening of skills of self-control. In the course of game training the person gets invaluable ability to resist to stress and diseases, studies in a new fashion to react to conflict situations, to reduce excessive internal pressure when the raised working capacity, strong-willed effort, attention mobilisation is required. Working out of structure of biooperated game training for creation of the independent hardware module in which for management of influence use a multiparametrical biological feedback, concerns the actual problems essentially expanding efficiency of treatment by means of computer game technologies of rehabilitation of various diseases of the person.

The work purpose - management optimisation by the virtual game training, directed on overcoming of competitive stress and ability to operate the functional condition by means of the scenarios including visible background and fixing image, and also discrete subsensitivity light signals.

Object of research are neurodynamics brain processes, electrophysiological processes of cardiovascular and respiratory system.

As subject of research information processes serve at recognition of functioning of cardiovascular, respiratory system, and also during carrying out of game biooperated training in real clinical conditions.

**Material and methods of researches**

In biotechnical system of game training the information presentation through an optical communication channel by means of colour impulses is provided. According to a frequency range of electroencephalogrammes, concerning to highly plastic to types, in which alpha rhythm share of essentially more share of a teta-rhythm. The similar structure of light impulses can provide transformation of pattern EEG and, hence, updating of a functional condition of the person [1,7].

We for these purposes had been developed models in a kind the coded colour patterns.

Let's consider an example of change of intensity of light influence at the expense of the directed manipulations with duration of an impulse and a pause at the frequencies corresponding teta and an alpha to a rhythm in the form of a spindle EEG. Only realisation of parametres colourstimulation, having the big coefficient of filling of a colour signal causes sensations of blinking of light.

It is known, that the functional kernel of pattern EEG is made by mutual relations an alpha and teta the rhythms forming 4 basic of type: teta (lf) + alpha (hf); teta (lf) + alpha (lf); teta (hf) + alpha (hf); teta (hf) + alpha (lf), where "lf" is Low frequency and "hf" is high frequency.

Noted types at healthy faces are highly steady against various influences and functional loadings and have correlation communications with that or other psychological profile of the person [2], and also with size pulsation arterial pressure [3]. Therefore, according to the psychological profile, each model of the formula of colour influence should have four formulas of influence of frequencies reflecting combination teta - and an activity alpha.

The real algorithm realising all forms of a combination a teta-alpha of rhythms, is presented in table 1.

Strengthening of parasympathetic influences promotes realisation of a condition of a relaxation of the patient.

One of ways of strengthening cholinergic regulation mechanisms is resonant breath with the period ten seconds.

Features of mechanisms of management of a rhythm the hearts caused by change of respiratory function of the patient, consist that breath with frequency 5-6 in a minute causes the greatest variations of pulse.

It is caused by the maximum stimulation of a wandering nerve as a result of action respiratory arrhythmia heart (RAH) [3,4,6].

In the literature such breath name metronome the similar breath, or more often, as resonant because transfer function of change heart rate at breath has the expressed functional resonance (FR) on frequency about 0,1 Hz.