

PHYSIOLOGY

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CLINICAL AND LABORATORY MONITORING OF ADAPTATION OF SOCCER PLAYERS TO PHYSICAL ACTIVITY RELATED TO SPORTS SUPPLEMENT INTAKE

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Abstract. We have carried out a study on the functional state of young soccer players on the background of taking the “Myasnoj Energetik” (“Meat Energy”) sports supplement. We examined the effect of the biologically active supplement on the biochemical composition, hormonal parameters regulating the body mass increase, and studied the indices of a complete blood count in athletes of the main and control groups over time on the background of sports nutrition intake. The data obtained show that a 2-month supplement intake contributed to an increase in the speed of performance in fixed periods, characterizing the power of performance with overall energy savings and improvement of blood biochemical parameters.

Keywords: adaptation, soccer players, blood, sports nutrition, hormones, physical activity.

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ANALYSIS OF NECROSIS MARKERS AND SPECIFIC AUTOANTIBODIES IN AN EXPERIMENTAL MODEL OF MYOCARDIAL STRESS OVERLOAD: COMPARATIVE ANALYSIS

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Abstract. The dynamics of autoantibodies to cardiac troponin I, cardiac muscle actin alpha 1, myosin heavy chain 7B, cardiac muscle beta and activity of alanine aminotransferase, aspartate aminotransferase, creatine phosphokinase at different stages of chronic physical overstrain modelling were studied in adult male rats. It was found that the increase in the level of autoantibodies occurred on days 15-20 of the experiment, when the animals had a high level of performance. The increase of alanine aminotransferase, aspartate aminotransferase and creatine phosphokinase was recorded on day 35, when there were already signs of developed chronic physical overstrain and progressive pathomorphological changes in myocardium were registered. The results demonstrate high relevance of autoantibodies to myocardial damage at an early stage and higher sensitivity in comparison with alanine aminotransferase, aspartate aminotransferase, creatine phosphokinase.

Keywords: physical activity, laboratory analysis, autoantibodies, cardiomyocytes, ischemia markers.

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BIOMARKERS IN PREDICTING MYOCARDIAL DAMAGE IN ATHLETES

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Abstract. Due to the increase in sudden death cases among athletes, the problem of early diagnosis of the formed disorders in the myocardium of athletes is relevant. In this work, we studied the dynamics of autoantibodies to cardiomyocyte proteins in the blood of basketball players at different stages of training cycles during a year. The autoantibodies content in the blood of the athletes was elevated at the end of the competitive period, which correlated with minor changes in the electrocardiogram. Two forward players with height of 209 cm and 203 cm had 5-fold and 7-fold increase of autoantibodies to cardiac troponin I and changes in electrocardiogram at the end of the competition period, while maintaining high general and special performance without complaints. Identification of autoantibodies to cardiomyocyte antigens has prospects for early detection of pathological changes in the myocardium.

Keywords: basketball, training, autoantibodies, cardiomyocytes.

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MODERN METHODOLOGICAL VIEW TO STUDY HUMAN BRAIN PHYSIOLOGY (LITERATURE REVIEW)

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Abstract. The purpose of this review paper was to summarize the current literature, including our own studies, containing prerequisites for the identification of a methodological component in the studies of human brain physiology. In our opinion, the analytical development of this direction is able to provide a neurophysiological, biochemical substantiation of the improvement and complication of physiological functions' cerebral regulation. According to modern concepts, the methodology of human brain's physiological studies represents a vector to decipher the cerebral mechanism of formation of a healthy deep worldview corresponding to the fundamental laws of the universe and principles of the functional system. Literature analysis has shown that diencephalic regulation of hierarchical relations of values and priorities is carried out in accordance with the fundamental principle of intracerebral energy redistribution and depends on the degree of optimization of cortical-subcortical interactions.

Keywords: physiology, brain, methodology, cortical-subcortical interactions.

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INFLUENCE OF SUBJECT-ORIENTED EDUCATION ON THE PSYCHOLOGICAL STATUS AND FUNCTIONAL STATE OF THE CENTRAL NERVOUS SYSTEM OF SCHOOLCHILDREN

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Abstract. Objective of the study: to identify the influence of subject-oriented education on the psychological status and functional state of the central nervous system of schoolchildren in grades 9-10. Using methods of psychological testing and computer chronoreflexometry, we examined 97 students. It was found that boys and girls with low and moderate state anxiety prevailed in specialized classes, with no highly anxious boys in the information technology class and no highly anxious girls in the socio-economic class in contrast to the general education class. The decrease in the state anxiety level in boys from the information technology class is combined with a decrease in aggression as measured by such parameters, as indirect aggression, suspicion and guilt. Improvement of socially significant psychological indices in boys is associated with stability of the central nervous system functioning. In girls from the information technology class, the increase in the level of trait anxiety was combined with an increase in complex hand-eye reaction time and a decrease in mode amplitude along with an increase in mode, which indicates the predominance of inhibition processes in the central nervous system and a decrease in the stability of its functioning. Thus, changes in anxiety and aggressiveness may serve as a sign of changes in the functional state of the central nervous system.

Keywords: schoolchildren, trait and state anxiety, aggressiveness, complex hand-eye reaction, central nervous system, predictors of maladjustment.

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INFLUENCE OF PARENTAL DEPRIVATION ON THE EMOTIONAL STATUS AND FUNCTIONAL STATE OF CARDIOVASCULAR SYSTEM IN STUDENTS OF THE SPECIAL EDUCATIONAL SCIENTIFIC CENTER

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Abstract. Aim of the study: to reveal the influence of parental deprivation on the functional state of cardiovascular system and anxiety in adolescents studying in major classes of the special educational scientific center. We found that for the 10th grade students with parental deprivation leads to a significant increase in the level of trait and state anxiety in girls and a decrease in the state anxiety level in teenage boys, as well as to disruption of the cardiovascular system functioning. Following markers of maladaptive disorders were identified: the level of trait and state anxiety, heart rate, variation range, mode amplitude, stress index, centralization index, level of the cardiovascular system's functional state. The data obtained are important for the development of a differentiated approach to the study of normality and pathology, taking into account genetically and socially determined personality traits and features of the cardiovascular system's regulation. The research results may be used to organize differentiated and individualized teaching.

Keywords: parental deprivation, schoolchildren, cardiovascular system, trait and state anxiety, markers of maladaptation.

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ELECTROLYTE IMBALANCE IN CARDIOVASCULAR SYSTEM DISORDERS AND ITS PREVENTION

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Abstract. The aim of the study was to investigate the effect of mildronate and propolis tincture on changes in brain natriuretic peptide and electrolyte balance regulation during the development of chronic heart failure. Preparations of propolis tincture and mildronate in adulthood under conditions of normal functioning electrolyte metabolism lead to a decrease in the levels of aldosterone, sodium and potassium in serum. In developing chronic heart failure, a significant increase in electrolyte metabolism parameters was registered. The application of both propolis tincture and mildronate against the background of developing chronic heart failure was accompanied by a decrease in the initially high content of brain natriuretic peptide, aldosterone, sodium and potassium in blood serum, which reflects a positive effect of these drugs on the myocardium and electrolyte balance and improvement of the body's condition in this pathology.

Keywords: brain natriuretic peptide, aldosterone, sodium, potassium, chronic heart failure, mildronate, propolis.

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COMPARATIVE INDICES OF FREE-RADICAL PROCESSES IN THE LIVER OF DOGS WITH ACUTE PANCREATITIS UNDER EFFECT OF NATURAL AND SYNTHETIC ANTIOXIDANTS

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Abstract. This study deals with the effect of various antioxidants on free-radical damage to the liver of dogs with acute experimental pancreatitis. It was found that at the initial stages of pancreatitis development, the rate of formation of diene conjugates is more intensively inhibited by vitamin E, and 4-methyl-2,6-di-tert-butylphenol is more effective from day 7. The transition from intermediate to final products of lipid peroxidation is most consistently inhibited by vitamin E. In 4-methyl-2,6-di-tert-butylphenol, this effect manifests itself from the 9th to the 24th hour and from day 7 to day 21.

Keywords: free-radical processes, acute pancreatitis, antioxidants.

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MODIFICATIONS OF ELECTROENCEPHALOGRAPHIC RHYTHMS UNDER THE INFLUENCE OF THE β -TRAINING COURSE IN ATHLETES OF DIFFERENT SPORTS

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Abstract. The article presents features of brain rhythm modification under the influence of beta rhythm neurofeedback course (β -training), including 10 26-minute sessions consisting of graphic and game sections. According to the lowest value of the theta rhythm to beta rhythm ratio (θ/β index, c.u.), which is considered to be an electroencephalographic index of attention, we identified effective sessions for athletes of different sports. The data on the specificity of electroencephalographic rhythm modification and periods of effective session formation in the β -training course may help to increase the efficiency of comprehensive training and recovery of athletes depending on the type of sport.

Keywords: athletes, β -training, brain rhythms, electroencephalographic index of attention.

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CHANGES IN STRESS REACTIVITY UNDER THE EFFECT OF HYDAZEPAM DEPENDING ON GENDER AND OVARIAN CONDITION IN RATS

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Abstract. We studied changes in stress reactivity depending on gender and functional state of ovaries in rats using hydazepam. In the multiparameter behavior estimation model, we registered gender-dependent differences in motor and emotional responses of rats after tranquilizer administration. We also found dose-dependent sedative effect at a dose of 0.4 mg/kg or activating effect at a dose of 2 mg/kg, as well as anti-anxiety effect of hydazepam in male rats. Development of anxiolytic sedative and anti-anxiety effects in females was discovered. The anti-anxiety effect of the anti-stress agent is more distinct in female animals. It was found that after spaying, the emotional reactivity of females did not decrease after hydazepam, and the anti-anxiety effect of the tranquilizer was not manifested.

Keywords: multiparameter testing, phobic anxiety reactions, hydazepam, females, males, spaying.

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CHANGE IN THE INTENSITY OF MOTOR DISORDERS ACCORDING TO GENDER AND OVARIAN FUNCTIONAL STATUS IN RATS

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Abstract. We studied the change in the intensity of motor disorders depending on gender and functional status of the ovaries in rats. The study included 88 white rats (Wistar, body mass – 200-220 g): 60 intact males and females, 28 spayed females. Catalepsy was formed by injecting haloperidol at a dose of 0.5 mg/kg intraperitoneally. Ovaries in female rats were removed according to a conventional procedure. In the haloperidol catalepsy test, more pronounced haloperidol-induced motor disorders were registered in female rats in the evening, and in male animals in the morning. Spaying has been shown to reduce the intensity of movement disorders in female animals.

Keywords: motor disorders, haloperidol induced catalepsy, females, males, spaying, post-spaying condition.

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INFLUENCE OF SMOKING ELECTRONIC CIGARETTES ON FUNCTIONAL INDICES OF THE RESPIRATORY SYSTEM OF GIRLS

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Abstract. We conducted a study on the effect of smoking electronic cigarettes on the initial changes in the functional parameters of the respiratory system of 2nd year female students. We measured body length, body mass, respiratory rate, respiratory volume, inspiratory reserve volume, expiratory volume, vital capacity of the lungs, forced vital capacity of the lungs, minute respiratory volume, forced expiratory volume in 1 second, average forced expiratory flow rate at the level of 25-75%, peak expiratory volume velocity, maximum volume velocities at the level of 25%, 50% and 75% of the Tiffeneau index. The results reflect a decrease in the functional parameters of the respiratory system of girls smoking electronic cigarettes, and may serve as the first sign of obstructive disorders.

Keywords: electronic cigarettes, girls, respiratory parameters.

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SENSORIMOTOR RESPONSE TIME IN STUDENTS WITH VARYING TYPES OF AUTONOMIC DYSFUNCTION

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Abstract. Objective of the study: to analyze the time of response to sound and light in female students with various types of autonomic dysfunction. The time of a simple and complex response to light differs between the indices in students with autonomic dysfunction, depending on the type of predominance: sympathicotonia or vagotonia. An increase in the anticipation response of female students with sympathicotonic predominance in autonomic dysfunction reflects the predominance of arousal processes over inhibition processes. In female students with vagotonic predominance, an increase in the time of response to light and sound, as well as delay time, indicates the predominance of inhibition processes over arousal processes.

Keywords: autonomic dysfunction, vagotonia, sympathicotonia, sensorimotor responses, hand-eye response, hand-ear response, central nervous system.

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ADAPTIVE CAPABILITIES OF THE CIRCULATORY SYSTEM IN FEMALE STUDENTS WITH DYSAUTONOMIA

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Abstract. The objective is to identify the functional capabilities and features of the circulatory system adaptation in female students with dysautonomia. Blood pressure in female students with dysautonomia is higher than in practically healthy female students of the control group ($p < 0.01$). According to the stress index, a significant proportion of girls with a predominance of parasympathetic influences and 14% with a predominance of the central control circuit of the circulatory system were identified in the group of students with dysautonomia. Oxygen saturation of peripheral vessels in female students with dysautonomia is significantly lower than in female students of the control group ($p < 0.001$).

Keywords: dysautonomia, circulatory system, female students, parasympathetic autonomic system, sympathetic autonomic system.

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ASSESSMENT OF ANTIANGIOGENIC ACTIVITY IN VIVO OF PLEUROTUS OSTREATUS FRUITING BODIES

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Abstract. The search for natural substances with an antiangiogenic effect is urgent. Basidiomycetes of the genus *Pleurotus* are of particular interest. The processing method may affect the biologically active properties of mushrooms. The purpose of the study was to evaluate the in vivo antiangiogenic activity of *Pleurotus ostreatus* fruiting bodies processed by different drying methods. Dehydration of mushrooms was carried out by lyophilization and hot air. The antiangiogenic properties of ethanolic extracts of dried *Pleurotus ostreatus* mushrooms were carried out in vivo on the chick embryo chorioallantoic membrane model by assessing the inhibition of vascular growth. It has been experimentally shown that for *Pleurotus ostreatus* as a biologically active raw material containing components with angiogenesis-inhibiting properties, the choice of dehydration method is of fundamental importance. On the vessels of the chorioallantoic membrane, the extract of *Pleurotus ostreatus* sublimate showed a moderate antiangiogenic effect. The extract of mushrooms dried with hot air had a relatively weak, half as much activity. The average vascular growth inhibition score was 1.09 ± 0.31 and 0.54 ± 0.29 respectively.

Keywords: antiangiogenic activity, chick embryo chorioallantoic membrane model, biologically active raw materials.

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DYNAMICS OF THE CORRELATION BETWEEN THE LEVEL OF ALPHA-FETOPROTEIN, TOTAL PROTEIN IN THE CHICKEN EMBRYO HOMOGENATE AND ITS MORPHOMETRIC PARAMETERS

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Abstract. The correlation of alpha-fetoprotein levels with total protein, body length and mass, mass of vital organs (liver, heart, lungs), expressed in different ways throughout the ontogenesis, has been established in the chicken embryo homogenate. All internal organs are characterized by a gradual decrease in the correlation between body mass and alpha-fetoprotein level. However, the degree of correlation with liver mass remains high up to 20 days. Functional correlation with liver mass was noted on day 12, although it remains pronounced in case of lung and heart mass. We also registered the minimum correlative relationship of the level of all studied parameters registered on day 20.

Keywords: alpha-fetoprotein, chicken embryo, ontogenesis, morphometric parameters, total protein.

BALNEOLOGY AND REHABILITATION

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INFLUENCE OF PERI-IMPLANT INFLAMMATION OF DIFFERENT SEVERITY ON CELLULAR AND ENZYME INTERACTIONS OF PHYSIOLOGICAL REMODELING HISTION

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Abstract. The objective of the study was to investigate the relationship between the changes in the number and functional activity of gingival cells and microcirculatory vessels with the aggravation of inflammation from normal to peri-implant mucositis and peri-implantitis. We performed histological study of biopsy specimens of the gingival mucosa intrinsic lamina, morphometry of the obtained micropreparations, spectrophotometry of enzyme activity in the capillaries of the gingival intrinsic lamina's connective tissue. Correlation analysis revealed a decrease in the activity of cells of fibroblastic origin on the background of peri-implant mucositis and, as a consequence, a decrease in collagenogenesis. Together with the decrease in the rate of energy-consuming processes in these tissues, which is slower the more severe the process of inflammation, these facts allow us to conclude about the inhibition of humoral and cellular immune interaction, as well as a decrease in the activity of enzymes in the vessels of the microcirculatory channel against the background of the development of a serious inflammatory reaction accompanied by the destruction of periodontal tissues.

Keywords: physiological remodeling histone, cell assortment, peri-implant inflammation, osseointegration, spectrophotometry, peri-implant mucositis, peri-implantitis.

THEORY AND METHODS IN SPORTS

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IMPROVING THE EFFICIENCY OF COMPETITIVE ACTIVITY OF 13-14-YEAR-OLD HOCKEY PLAYERS ON THE BASIS OF OPTIMIZING THE LINE COMPOSITION

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Abstract. The psychological preparation of athletes and the harmony in players' teamwork in team sports plays a big role in the effectiveness of sports activities. Adolescence is a difficult psychological period in the life of athletes, and the interaction of adolescent players can be a significant problem in the theory and methodology of sports training. The scientific article presents data on the development and substantiation of a methodology for composing hockey players' lines for their effective interaction taking into account the temperament type. As a result, the performance indices of in-game activity improves significantly: cross passes, forward passes, puck control and reception, shooting on goal. Consequently, when forming the lines of adolescents, it is necessary to take into account the temperament types and the compatibility of athletes with each other.

Keywords: compatibility features, hockey players, temperament types, in-game interactions, competitive activity analysis.

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PROFESSIONALLY IMPORTANT COORDINATION COMPONENTS IN THE ACTIVITY OF SOCCER REFEREES

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Abstract. Refereeing is an activity that includes physical loads and is described with complex motor acts. Objective of the study – to identify professionally important coordination components in a soccer referee's activity. As a result, we defined professionally important coordination abilities for a referee's activity on a soccer field. We also found a connection between the aforementioned abilities and performance of a soccer referee. The revealed level of correlation of the previously mentioned coordination components remains within limits of strong statistical interrelation, namely: orientation in space, movement coordination, motor action restructuring, coordination endurance. We managed to identify reasons for making mistakes by referees in Super League matches.

Keywords: referee, soccer, coordination abilities, professionally important qualities.