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АКТУАЛЬНІ ПРОБЛЕМИ ТА СУЧАСНІ ДОСЯГНЕННЯ**

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3MICT

<i>Addepalli Santhosh, Hloba N.S., Hloba A.A.</i>	
ROLE OF GAIT ANALYSIS IN DIAGNOSTICS OF NEUROLOGICAL DISEASES.....	9
<i>Amara Taha Morad, Isaeva I.N.</i>	
FUNCTION AND DYSFUNCTION OF BARORECEPTORS	9
<i>Bibhu Charan Nayak, Nataliia Hloba, Inna Isaeva</i>	
APPLICATION OF CARDIOPLEGIC SOLUTION IN CLINICAL PRACTICE	10
<i>Danylko M.</i>	
COMPARATIVE ANALYSIS OF THE EFFICIENCY OF DIAGNOSTIC AND TREATMENT MEASURES BY WOMEN WITH ECTOPIC PREGNANCY.....	11
<i>Grishenko D.O., Girka D.E., Isaeva I.N.</i>	
FEATURES OF REGULATION OF CIRCULATION DURING EXERCISES	12
<i>Hady Al-Rihani, Irina S. Karmazina</i>	
CYTOKINES AND C-REACTIVE PROTEIN TRIGGER THE HEMOSTASIS SYSTEM IMBALANCE IN INFLAMMATION	13
<i>Kucherenko I.O., Novikova D.S., Kotsur V.E., Hloba N.S.</i>	
PECULIARITIES OF METEOPATHY LEVELS IN YOUNG PEOPLE FROM DIFFERENT COUNTRIES	14
<i>Lance-Onyeiwu Isaac Akunna, Beulah Nwokotubo, Isaeva I.N.</i>	
EATING ATTITUDE DISORDERS IN YOUNG WOMEN	14
<i>Nana Aisha Onisarotu, Viktoriia Chemes</i>	
ATTITUDE OF PATIENT'S TOWARDS MEDICAL STUDENTS IN THE UKRAINIAN POPULATION.....	15
<i>Omar Bajbouj, Mahmoud Alsharif, Nataliia Hloba, Irina Karmazina</i>	
ACUTE MYELOID LEUKEMIA	16
<i>Peleshenko O.I., Kovalyov M.M., Isaeva I.N.</i>	
DYNAMICS OF CARDIOVASCULAR SYSTEM INDEXES IN YOUNG PEOPLE WITH ARTERIAL HYPOTENSION DURING PHYSICAL ACTIVITY	17
<i>Ponomareva A.M., Nagovskaya D.M., Shakina L.A.</i>	
SKIN AGING AND METHODS FOR ITS PREVENTION	18
<i>Sabareesh Sridharan, Baskar Kalaivani, Rajasaimani Kandeewari, Nataliia Hloba</i>	
BLOOD PRESSURE LEVELS IN TRAINED AND UNTRAINED FOREIGN STUDENTS	18
<i>Sader Abbas, Vasylieva O.V.</i>	
THE EFFECT OF CHRONIC ELECTRICAL STIMULATION ON THE PHYSIOLOGICAL PROPERTIES OF MUSCLES IN PATIENTS WITH MYOTONIC DYSTROPHY.....	19
<i>Shivan Amin, Vasylieva O.V.</i>	
SALIVARY GLANDS AND THEIR PHYSIOLOGICAL ROLE	19
<i>Siwar Dahamsha, Vasylieva O.V.</i>	
VIOLATIONS OF COLOR VISION IN ARAB POPULATION.....	20
<i>Zlenko V.V., Sokol E.N., Kovalyov M.M., Hloba A.A.</i>	
PSYCHOPHYSIOLOGICAL PECULIARITIES OF ADAPTATION TO ELECTROMAGNETIC RADIATION OF RADIOFREQUENCY WAVE BAND IN PEOPLE WITH DIFFERENT TYPES OF AUTONOMIC REGULATION	21
<i>Student V.</i>	
STUDY OF BIODISTRIBUTION OF MAGNETIC NANOPARTICLES IN RAT MODEL EX VIVO USING ATOMIC-FORCE MICROSCOPY.....	21
<i>Sukhov V.A.</i>	
CYTOGENETIC FEATURES OF ADOLESCENTS WITH PHOBIC-ANXIETY DISORDERS	22
<i>Topchii S.</i>	
MORPHO-FUNCTIONAL FEATURES OF THE CEREBELLAR TONSIL	23
<i>Tymbota M., Chernobay L.V.</i>	
RESEARCH OF INTERSYSTEM INTEGRATION IN PROCESS OF ADAPTATION TO PSYCHO-EMOTINAL STRESS IN CONDITIONS OF PHYSICAL LOAD	24
<i>Vasylyev D.V., Vasylieva O.V.</i>	
PHLEBOANGIODYSPLASIAS AND POSSIBILITIES OF THEIR CORRECTION AT KLIPPEL-TRENAUNAY-WEBER SYNDROME.....	24
<i>Vedavyas Medikonduri, Hloba N.S., Hloba A.A.</i>	
PHYSIOLOGY OF BONE HEALING	25
<i>Velyka A.Ya.</i>	
FUNCTIONAL CONDITIONS OF THE RAT KIDNEYS UNDER THE SALT LOAD.....	26
<i>Wise Asiome, Irina S. Karmazina, Inna N. Isaeva</i>	
SICKLE CELL DISEASE – UNDERLYING PHYSIOLOGICAL FACTORS FOR PROGNOSIS OF OUTCOME AND DEVELOPMENT OF TREATMENT	27
<i>Yadav Balbir Singh, Roman V. Alekseyenko</i>	
THE DIRECTIONS OF STUDENT'S HEALTH IN TERMS OF TRAINING LOAD EFFECTS ON THE BODY.....	29
<i>Александрова Е.В., Глоба Н.С., Чернобай Л.В.</i>	
ЭФФЕКТИВНОСТЬ СОЦИАЛЬНО-ПСИХОЛОГИЧЕСКОЙ АДАПТАЦИИ ЛИЦ ЮНОШЕСКОГО ВОЗРАСТА В ЗАВИСИМОСТИ ОТ УРОВНЯ НЕЙРОТИЗМА	30

Hady Al-Rihani, Irina S. Karmazina
**CYTOKINES AND C-REACTIVE PROTEIN TRIGGER
 THE HEMOSTASIS SYSTEM IMBALANCE IN INFLAMMATION**

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Recent studies have confirmed hypothesis about crucial role of cytokines and C-reactive protein (CRP) in progression of inflammation (Г.И. Васильева, 2001). Cytokines are pluripotent short-distant molecules that are synthesized by activated cells of immune system; they mediate intercellular communications as well as stimulation or inhibition of cell growth, their differentiation, functional activity and apoptosis. CRP has been evaluated as “gold marker” of inflammation and predictor of various pathological states such as myocardial infarction, acute renal and cardiac insufficiency, acute coronary syndrome, sepsis, neoplasia of different localizations. It has been proved experimentally that pro-inflammatory cytokines such as interleukin-1 (IL-1), IL-6, IL-12, IL-3, tumor necrosis factor- α (TNF- α) realized their effects through direct stimulation of CRP expression (B. Paimany, 2002). On the other hand, reaction of inflammation, accompanying appearance of foreign antigens in an organism (independently from their origin: whether these are bacteria and viruses, or self-cells malignization), often results in disorders of hemostasis system. Imbalance develops due to the extra activation of coagulation mechanisms with simultaneous downregulation of anticoagulant pathways and suppression of fibrinolysis (S. Lipinsky, 2011). Nowadays, cytokines and CRP are considered as highly relevant factors which trigger both inflammation and hypercoagulation (T. van der Poll, et al., 2011). Nevertheless, mechanisms of the interplay between cytokines and CRP, triggering inflammation reaction and factors of haemostasis, are still unclear and require following investigations.

The aim of our research was studying of pro-inflammatory link of cytokines' network and CRP concentration as well as parameters of hemostasis systemic conditions of inflammation process.

For the research, blood samples of patients with acute inflammation (paratonsillar abscess, n=25) have been used; control cohort was represented by healthy people (without acute or chronic inflammation, n=20). Parameters of hemostasis system such as fibrinogen concentration, activated partial thromboplastin time (APTT), prothrombin time (PT), international normalized ratio (INR) and activity of antithrombin III (AT III) have been defined in blood plasma with the help of standard kits (“Renam”, Russia) by routine methods. Concentrations of cytokines such as IL-1 β , IL-6 and TNF- α have been determined in blood sera by the immunoenzyme method (“Vector-best”, Russia). CRP concentration has been defined by the turbid metric method (kits “Vital Diagnostics”, Russia). Statistical processing of data has been used for figures assessment (Excel for Windows 10).

It has been found out that in blood sera of patients with paratonsillar abscess concentrations of pro-inflammatory cytokines as well as CRP were elevated in comparison with control cohort which therefore results from acute inflammation process. Thus, concentration of IL-1 β has been increased in 2.8 folds (12.48 \pm 2.88 pg/ml against 4.37 \pm 1.84 pg/ml in control; p<0.01); concentration of IL-6 has exceeded control values in 2.6 times (9.99 \pm 1.76 pg/ml, and 3.89 \pm 1.81 pg/ml in control; p<0.01); and concentration of TNF- α has been elevated in 3.6 times (11.35 \pm 1.76 pg/ml, and 3.11 \pm 1.23 pg/ml in control; p<0.01). Concentration of CRP has been increased in 2.0 folds (5.55 \pm 0.63 pg/ml, and 2.78 \pm 0.38 pg/ml in control; p<0.01).

Investigated parameters of haemostasis system have demonstrated signs of hypercoagulation in patients with paratonsillar abscess. Concentration of fibrinogen has been elevated; it reached 5.11 \pm 0.64 g/L (3.15 \pm 0.43 g/L in control; p<0.01). Increase fibrinogen concentration results from inflammation due to the fact that fibrinogen is an acute phase reactant (E. Hantganet al, 2001). Elevations in fibrinogen levels are associated with an increased risk of thrombotic disease. Such parameters as APTT and PT have been shortened down; they have constituted correspondently 38.7 \pm 2.99 sec (46.9 \pm 4.98 sec in control; p<0.05) and 11.1 \pm 0.47 sec (14.5 \pm 0.8 in control; p<0.05). INR has been reduced till 0.84 \pm 0.04 (1.12 \pm 0.07 in control; p<0.05). Due to the fact that PT and INR reflect events of extrinsic pathway of coagulation cascade, their activation in inflammation process can be regarded as evidence that cytokines are involved into activation of this mechanism. This is in concern with results of multiple researches that have demonstrated that tissue factor (TF), which is the most important initiator of the extrinsic coagulation cascade, belongs to class II cytokine receptor family. It is the cofactor for the activated plasma clotting factor VII (FVIIa) which catalyzes the activation of factor X and IX and leads to the generation of thrombin and thus, finally, of a fibrin clot. Under physiologic conditions, TF is abundantly expressed only in the adventitia, nevertheless in many pathologic conditions its activation is induced by several inflammatory mediators such as IL-6 and IL-1 β (G. Demetz, I. Ott, 2011). Shortening of APTT, which is the parameter for the assessment of intrinsic mechanism of coagulation cascade, has revealed that cytokines may contribute into hypercoagulation by activation of this pathway as well. In accordance to scientific figures, inflammatory mediators presumably increase the number of microparticles in circulation, i.e. phospholipids for prothrombinase complex generation, through leucocyte activation, so that they can lead to factor XII activation and involvement of intrinsic mechanism of coagulation through kallikrein-kinin system (C.T. Esmon, 2005). Meanwhile, our research has shown that activity of AT III

has been reduced to 77.6±4.5% (100.9±9.3% in control). Suppressed activity of AT III can be explained by the experimental data *in vitro* that revealed ability of inflammatory cytokines and neutrophil activation products to decrease concentration of heparin-like molecules (M. Levi et al., 2003) which are natural cofactor of AT III. Thus, this decrease in antithrombin concentration results in delayed inhibition of coagulation enzymes that favours intravascular coagulation.

In conclusion, the results of our research have confirmed that elevated levels of pro-inflammatory cytokines such as IL-1 β , IL-6 and TNF- α as well as CRP in inflammation are associated with imbalance of haemostasis system:

1. Increased concentration on fibrinogen, shortening of APTT and PT, reduced INR are markers of amplification of coagulation cascade.

2. Decreased activity of AT III sustains the suppression of anticoagulant system, and probably results from downregulation or degradation of heparin-like cofactor molecules of AT III by cytokines.

These disorders of haemostasis system might be complicated by risk of thrombosis and disseminated intravascular coagulation in patients with paratonsillar abscess.

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PECULIARITIES OF METEOPATHY LEVELS IN YOUNG PEOPLE FROM DIFFERENT COUNTRIES

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Background. Adaptation of human organism to changes of weather occurs permanently and is one of the components of general adaptation. The level of meteosensitivity is individual and depends on various factors, including age, gender, type of higher nervous activity (HNA), availability of chronic diseases, conditions of labor and rest etc. Climate change and influence of new meteorological factors may lead to disorders of physiological adaptive mechanisms that will show in form of meteopathic reactions development.

The aim of current research was to study the differences of meteosensitivity levels in young people that permanently live in Ukraine and that came from various countries.

Materials and methods. The research was carried out in 55 persons aged 17–21, among them 25 Ukrainian (1st group) and 30 foreign students (2nd group). Meteosensitivity level was determined using questionnaire “Meteo-Q”, HNA type was studied with help of Eysenck Personality Inventory (EPI).

Results and their discussion. According to the meteosensitivity level, changes of psychic state due to changes of weather conditions were determined in 72 % of Ukrainian students, among them 20 % have high level of changes, 52 % – medium and 28 % – low level of psychic changes. Changes of physical state in form of dizziness, headache, pain in muscle and joints were determined in 56 % of people of 1st group; from them 16% have high level of weather factors influence, 40 % – medium and 44 % – low level. In 2nd group 90 % of examined people have psychic changes during weather changes, 53,3 % have high level of changes, 36,7 % – medium and 10 % – low level. Physical state is influenced by weather conditions in 86,7 % of 2nd group people, among them 56,7 % with high level of changes, 30 % with medium and 13,3 % with low level. Such difference in meteopathic reactions intensity may be explained by increased stress levels because of necessity to adapt to totally new environmental and social conditions. EPI studies showed that in Ukrainian students 52 % have choleric and melancholic types of HNA characterized by relatively worse adaptation than phlegmatic and sanguine. Among 2nd group percentage of low adaptive HNA types rises to 73,4 %, that may further increase the manifestation of meteopathic reactions.

Conclusion. The difference in meteosensitivity levels in people from different countries was determined. Ukrainian students show better adaptation thus lower meteopathy manifestations than foreign students (18 % less of psychic reactions and 30,7 % less of physical state changes). Such difference can be related to greater straining of physiological adaptive mechanisms in foreign students because of climate changes, action of new meteorological factors, increased emotional stress due to change of country, and also can be caused by prevalence of HNA types with weaker adaptive capabilities (73,4 % comparing to 52 % in Ukrainian students). However, numerous factors that can cause meteopathic reactions manifestation and high meteosensitivity level in both examined groups prove the necessity of further profound research in that area.

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EATING ATTITUDE DISORDERS IN YOUNG WOMEN

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Background. Anorexia nervosa (AN) is a severe disorder affecting every bodies system. It is characterized by a restriction in energy intake, body-imagedisturbance, under influence of body image on self-evaluation, and an intense fear of weight gain. Anorexia can involve a failure to recognize the seriousness of low body weight and a difficulty in acting to correct this. The condition involves extremely high