THE LABORATORY MEDICINE AS A FOUNDATION FOR PERSONALIZED MEDICINE. THE APPLICATION OF BIOCHIPS IN MEDICINE

S.N. Scherbo1, D.S. Scherbo2
1The N.I. Pirogov Russian national research medical university Minzdrav of Russia, 117997 Moscow, Russia; 2The institute of bio-organic chemistry of the Russian academy of sciences, Moscow, Russia

The development and application of biochips provide possibility to drastically transform laboratory medicine and to implement studies of arrays of biomarkers realizing approaches and concepts of personalized medicine. The main areas of application of microbiochips in laboratory medicine such as laboratory diagnostic, classification and prognosis of course of diseases, analysis of mechanisms of biologic processes are considered. The identification of inherent mutations in human genome is considered as perspective direction. These mutations cause various pathology and first of all oncologic diseases responsible for biotransformation of pharmaceuticals applied in chemotherapy of tumors in particular and also simultaneous identification of various infection agents (viruses, microorganisms, fungi, etc.) and their antibiotic-resistant forms. The role of biochips as a tool is demonstrated in genetic studies, technologies of genetic typing, large-scale international projects of studies of genome-wide screening of associations (GWAS).

Keywords: biochip, personalized medicine, genetic typing, pharmacogenetics

THE IMPACT OF CONCENTRATIONS OF NITRIC OXIDE AND ACTIVITY OF OXISTAT ON DEVELOPMENT OF INFLAMMATORY ALTERATIONS IN VASCULAR WALL

V.V. Nikitina1, N.B. Zakharova1, G.P. Gladilin1, G.V. Korshunov2
1The V.I. Razumovskiy Saratov state medical university of Minzdrav of Russia, Saratov, Russia; 2The Saratov research institute of traumatology and orthopedics of Minzdrav of Russia, Saratov, Russia

The analysis was applied to results of study of impact of concentrations of nitric oxide and activity of oxistat on development of alterations in vascular wall in patients with different stages of atherosclerosis of vessels. The priority indicators according established marker are revealed.

Keywords: diabetes mellitus type I and II, chronic cerebral ischemia degree I-II, arteriosclerosis obliterans of lower extremities degree I-III, nitric oxide, oxistat, growth factor of endothelium of vessels, monocytic chemo-attractant protein-1, endothelin-1

THE α-DEFENSINS, PEPTIDES AND PROTEINS SYNTHESIZED AND LIBERATED BY NEUTROPHILS UNDER ATHEROSCLEROSIS OF DIFFERENT LOCALIZATION


The academician E.A. Wagner Perm state medical academy of Minzdrav of Russia, 614990 Perm, Russia

In recent years, the scientific publications about disorder the scientific publications appeared concerning derangement of content of α-defensins in neutrophils of patients with atherosclerosis. The interest increases both to different derangement of protein- synthesizing function of neutrophils and to biological effects caused by defensins and other peptides and proteins taking part in anti-microbial defense of human organism. With purpose to study content of α-defensins (1-3) and synthesis and liberation of other proteins and peptides by neutrophils the concentrations of α-defensins, lipoprotein (a), C-reactive protein, precursor of cerebral natriuretic peptide, coagulation factor VII and von Willebrand factor were determined in supernatants of leukocytal cultures in patients with exertional angina pectoris and atherosclerosis of lower extremities. The evaluation of loading test was implemented in vitro with α-tumor necrosis factor in vitro. Simultaneously, serum concentrations of cytokines and pro-atherogenic proteins were analyzed. It is established that in patients with ischemic heart disease derangement of protein-synthesizing function of neutrophils is observed. The derangement is manifested in the form of decrease of synthesis of α-defensins, increase of synthesis of lipoprotein (a), precursor of cerebral natriuretic peptide, C-reactive protein and von Willebrand factor. The pathogenic role of α-tumor necrosis factor is established. The increase of concentration of interleukin-8 in blood serum is revealed.

Keywords: defensins, pro-atherogenic protein, peptide, neutrophils, atherosclerosis, cytokines, regulation

THE LIPID COMPOSITION OF MEMBRANES OF ERYTHROCYTES IN ATHLETES OF CYCLIC TYPES OF SPORT

S.S. Osotchuk, A.F. Martsinkevitch

The Vitebsk state medical university of Minzdrav of Republic of Belarus, 210023 Vitebsk, Republic of Belarus
The lipid composition of membranes of erythrocytes in athletes of cyclic types of sport with qualification from first adult class to Master of Sports and persons doing no sports was analyzed. The qualitative and quantitative analysis of phospholipid fractions and fatty-acid specter of sphingomyelin and phosphatidylcholine was implemented. In athletes, amount of sphingomyelin and phosphatidylcholine and percentage content of phosphatidylcholine were significantly increased. The percentage content of kefalin was also decreased. The ratio of sphingomyelin/phosphatidylcholine was lower on 52.3%. In fatty-acid specter of sphingomyelin and phosphatidylcholine of athletes the percentage of C14:0 and C16:0 was decreased. In phosphatidylcholine increase of content of C16:1 was noted and in sphingomyelin content of C18:3 was increased. The ratio of sums of saturated fatty acids/ polyunsaturated fatty acids were lower in athletes. The study results testify significant alterations in membranes of erythrocytes caused by regular physical loads and probably favoring increase of functional activity.

Keywords: membrane of erythrocyte; phospholipid; sport.

KL-1405-021
THE POSSIBILITIES OF MODERN AUTOMATED CLINICAL BLOOD ANALYSIS IN DIFFERENTIATED DIAGNOSTIC OF TRUE AND REDISTRIBUTING (FUNCTIONAL) IRON DEFICIENCY UNDER ANEMIC SYNDROME IN ONCOLOGIC PATIENTS
G.N. Zubrikhina, V.N. Blindar, I.I. Matveyeva
The N.N. Blokhin Russian oncologic research center of the Russian academy of medical sciences, Moscow, Russia
The clinical blood analysis implemented at modern hematological analyzers can be used as a foundation for primary differentiated diagnostic of anemic syndrome related to true and functional iron deficiency in oncologic patients. The normocyte normochromic anemia with normal and higher level of hemoglobin of reticulocytes (RET-HE) testifies presence in higher degree of anemia of chronic diseases which is more often combined with higher content of serum ferritin (Ferr), lower level of soluble receptors of ferritin (sTfR) and production of erythropoietin (EPO) inadequate to anemia degree. The microcyte hypochromic anemia can be present both under iron-deficient anemia and under functional iron deficiency as a result of its blocking in macrophages under anemia of chronic diseases in oncologic patients. Hence the differentiated diagnostic of these states demands additional analysis of content of serum ferritin, soluble receptors of ferritin and production of erythropoietin.

Keywords: anemia, oncologic patient, ferritin, soluble receptors of ferritin, erythropoietin, delta-hemoglobin

KL-1405-025
THE SIGNIFICANCE OF IMMATURE GRANULOCYTES IN DIAGNOSTIC OF INFECTIOUS INFLAMMATORY PROCESSES IN CARDIOSURGERY PATIENTS
O.V. Petrova, S.A. Shashin, D.G. Tarasov
The Federal center of cardiovascular surgery of Minzdrav of Russia, Astrakhan, Russia
The evaluation was implemented concerning the values of automated parameter “immature granulocytes” in cardiosurgery patients. It is demonstrated that amount of immature granulocytes in peripheral blood exceeding 2% indicates development of infectious inflammatory process (sepsis). The monitoring of amount of immature granulocytes in cardiosurgery patients makes it possible to evaluate effectiveness of applied therapy, severity of patient condition, course of post-surgery period and outcome of disease.

Keywords: hematologic analyzer, immature granulocytes, sepsis, cardiosurgery

KL-1405-027
HYPERSENSITIVITY REACTIONS: MECHANISMS OF DEVELOPMENT, CLINICAL SYMPTOMS, PRINCIPLES OF DIAGNOSIS (LECTURE)
S.U. Tyukavkina, G.G. Charseeva
This article deals with the principles of hypersensitive reactions modern classification, pathogenetic development mechanisms of its different types that cause the progression of typical clinical symptoms and syndromes. This knowledge is essential for different types of doctors because it enables to make and give precise provisional diagnose as well as refer a patient to allergist-immunologist timely. Special attention is paid to pathogenesis of a disease and a syndrome that arise from IgE-mediated hypersensitive reactions due to the fact that they occur frequently and require the emergency medical care of a patient. The diagnostic procedure of allergic diseases must involve general and special diagnostic methods. While choosing special allergy diagnostic testing methods one should take into account two factors: effectiveness of methods and their impact on patient health and safety. Correct diagnose is based strictly on the set of test results. One should aslo keep in mind that there are non-allergic hypersensitive reactions having similar clinical manifestations to IgE-mediated allergic reactions. Such reactions are also called anaphylaxis and it is important to know their main causes and mechanisms of formation.

Key words: hypersensitive reactions modern classification; IgE-mediated hypersensitive reactions; allergic disorder diagnosis; nonallergic hypersensitivity reactions.
THE STUDY OF PROFILE OF HYPERSENSITIVITY TO POLLEN AND FUNGAL ALLERGENS IN THE MOSCOW REGION
I.G. Akhapkina, S.N. Krakhanenkova, E.V. Dobronravova, E.N. Shushpanova

The I.I. Metchnikov research institute of vaccines and serums of the Russian academy of medical sciences, Moscow, Russia

The profile of hypersensitivity to pollen and fungal allergens is an important element of common pattern of immune diseases needed for development of effective pharmaceuticals. The purpose of the study was to analyze the rate of detection of combined forms of hypersensitivity to pollen and fungal allergens (pollen of birch, hazel, cocksfoot, wormwood, fungi A. alternata, C. herbarum, R. nigricans, P. notatum, C. albicans, A. fumigatus) in the Moscow region on the basis of data of scarification skin samples. The monosensibilization was established in 23.36% of all cases of hypersensitivity. At that, among leading allergens turned out A. alternata and cocksfoot pollen (6.54% and 4.67%), followed by allergens of wormwood pollen, P. notatum, R. nigricans, birch pollen and C. albicans (3.74%, 3.74%, 1.87%, 1.87% and 0.93% correspondingly). The polysensibilization was established in 51.40% of cases. Besides, the combined hypersensitivity to pollen allergens of plants (20.26%) and to pollen and fungal allergens (20.56%) occurred more frequently. In the group of patients with polysensibilization predominated combined allergic reactions to pollen allergens and A. alternata allergens (36.36%). On the whole, most frequently occurred sensitization to allergens of birch, hazel, cocksfoot, wormwood and A. alternata allergen (76.14%, 69.32%, 57.95%, 55.68%, 39.77% and 56.82% correspondingly). In the Moscow region predominate combined forms of hypersensitivity to two and more pollen and fungal allergens. The polysensitization to pollen allergens and A. alternata allergen occurs more frequently.

Keywords: combined hypersensitivity, fungal allergen, pollen allergen, monosensitization, polysensitization

THE DIAGNOSTIC VALUE OF ANTIBODIES TO ANNEXIN AND B2-GLYCOPROTEIN FOR VERIFICATION OF ACTIVE COURSE OF HERPESVIRAL INFECTIONS OF PREGNANT WOMEN
T.I. Dolgikh, S.V. Barinov, T.V. Kadtsyna

The Omsk state medical academy of Minzdrav of Russia, 644043 Omsk, Russia

The article deals with results of analysis of hemostasiological and immunological alterations under reactivation of herpesviral infections during pregnancy. The formation of pathological thrombinemia, activation of intra-vascular blood clotting, increasing of factors resulted in damage of endothelium under active course of herpesviral infection and increasing risk of development of obstetric pathology are demonstrated. The antibodies to B2-glycoprotein class IgM and antibodies to annexin class IgM, IgG can be operated as diagnostic signs of activation of herpesviral infection during pregnancy.

Keywords: herpesviral infection, pregnancy, diagnostic, antibodies to B2-glycoprotein

THE DEVELOPMENT OF REAGENTS SET IN THE FORMAT OF DNA-CHIP FOR GENETIC TYPING OF STRAINS OF VIBRIO CHOLERAE

The central research institute of epidemiology of Rospotrebnadzor, 111123 Moscow, Russia

The necessity of development of methods of genic diagnostic of cholera is conditioned by continuation of the Seventh pandemic of cholera, taxonomic variability of strains of Vibrio cholerae involved into pandemic and also permanent danger of delivery of disease to the territory of the Russian Federation. The methods of genic diagnostic of cholera make it possible in a comparatively short time to maximally minutely characterize strains isolated from patients or their environment. The article presents information about working out reagents set for genetic typing of agents of cholera using DNA-chip. The makeup of DNA-chip included oligonucleotide probes making possible to differentiate strains of V. cholerae on serogroups and biovars and to determine their pathogenicity. The single DNA-chip makes it possible to genetically type up to 12 samples concurrently. At that, duration of analysis without accounting stage of DNA separation makes up to 5 hours. In the progress of work, 23 cholera and non-cholera strains were analyzed. The full compliance of DNA-chip typing results to previously known characteristics of strains. Hence, there is a reason to consider availability of further development of reagents set and possibility of its further application in laboratories of regional level and reference centers.

Keywords: cholera, genetic typing, DNA-chip, reagents set.

THE VIBRIO-STATIC TEST WITH NICLOSAMIDE TO IDENTIFY BACTERIA OF GENUS VIBRIO
E.P. Sivolodskiy

The S.M. Kirov military medical academy of Minoborona of Russia, St. Petersburg, Russia

The necessity of development of methods of genic diagnostic of cholera is conditioned by continuation of the Seventh pandemic of cholera, taxonomic variability of strains of Vibrio cholerae involved into pandemic and also permanent danger of delivery of disease to the territory of the Russian Federation. The methods of genic diagnostic of cholera make it possible in a comparatively short time to maximally minutely characterize strains isolated from patients or their environment. The article presents information about working out reagents set for genetic typing of agents of cholera using DNA-chip. The makeup of DNA-chip included oligonucleotide probes making possible to differentiate strains of V. cholerae on serogroups and biovars and to determine their pathogenicity. The single DNA-chip makes it possible to genetically type up to 12 samples concurrently. At that, duration of analysis without accounting stage of DNA separation makes up to 5 hours. In the progress of work, 23 cholera and non-cholera strains were analyzed. The full compliance of DNA-chip typing results to previously known characteristics of strains. Hence, there is a reason to consider availability of further development of reagents set and possibility of its further application in laboratories of regional level and reference centers.

Keywords: cholera, genetic typing, DNA-chip, reagents set.
The new vibrio-static niclosamide (CAS № 50-65-7) is revealed. The vibrio-static test with niclosamide (10 mkg/disc) to identify bacteria of genus Vibrio is developed. This test by its diagnostic sensitivity surpasses the vibrio-static test with vibrio-static O129 since it suppresses growth of vibrios having cross resistance to O129 and co-trimoxazole. The vibrio-static test with niclosamide made it possible to identify all examined strains of V. metschnikovii, V. vulnificus, V. parahaemolyticus, V. cholerae non O1/non O139.

Keywords: vibrio-static test, niclosamide, vibrio-static O129, co-trimoxazole, diagnostic sensitivity, V. metschnikovii, V. vulnificus, V. parahaemolyticus, V. cholerae

KL-1405-056
FROM LABORATORY TO PRACTICE: COUNSELING WITH CLINICIANS
I.D. Watson
The clinical laboratories of University hospital of Aintree, Liverpool, Great Britain
The provision of medical laboratory services is a key element in diagnostic and treatment. The care of analytical quality remains in focus of attention. The interest to pre-analytical quality increased. However, alongside with it quality of post-analytical stage and such its significant element as support of timely and effective application of laboratory results in interest of patient has great importance. The purpose of study was to consider approaches to development of this aspect of medical laboratory practice and to demonstrate the modes which proved their effectiveness.

Keywords: analytical quality, pre-analytical quality, quality of post-analytical stage, application of laboratory results

KL-1405-060
THE LABORATORY SPECIALIST AND CLINICAL INTERPRETATION OF LABORATORY RESULTS
V.V. Menshikov
The I.M. Sechenov first Moscow medical university of Minzdrav of Russia, 119992, Moscow, Russia
The requirements of standards concerning content of laboratory consulting services, including and discussion about individual clinical cases. The information about grounds of interpretation of results of laboratory analyses is presented. The methods of comparison with reference intervals values and decision thresholds, evaluation of effects of various types of non-pathogenic variations, including pharmaceuticals took by patient are considered. The unacceptability of conventional evaluation of obtained results and necessity of individual approach in clinical decision making is emphasized. The particular attention is paid to responsibility of laboratory for urgent informing of clinicians about detected critical alterations of laboratory indicators in patients with high risk of unfavorable outcome. The article presents information about literary sources based both on recommendations of laboratory specialists concerning interpretation and application of laboratory tests and on evaluation of significance of laboratory information under various forms of pathology by leading representatives of clinical disciplines.

Keywords: laboratory consulting services, involvement of laboratory specialists into interpretation of laboratory analyses results, reference intervals, decision thresholds, effect of non-pathogenic variations on laboratory result, urgent informing of clinicians about detected critical alterations of laboratory indicators