2015 № 1

ЗМІСТ
(Contents)

HERPESVIRUS INFECTIONS: MYTHS AND REALITIES
Makarenko V. D.

Herpesvirus infections (HVI) is known for more than two millennia, and its main symptoms described by Hippocrates more. But our time HVI remains mysterious and before the end of the unknown. Among the issues are not sufficiently clarified latency of infection and persistence of herpes viruses, the causes of the frequent occurrence of the disease in the form of subclinical forms, high infection rate of the world population, and others. Note that virologists and clinicians are showing in the last 20 years to the HVI, is associated with a variety of ever-increasing role Herpesviridae in infectious pathology of human and social importance of diseases caused by them. It is now known 8 herpesviruses pathogenic for humans. Because of the difference in a number of biological properties, the nature of replication in cell cultures, the clinical picture and the pathogenesis of diseases caused by all herpesviruses are distributed according to the recommendations of the International Committee on Taxonomy of Viruses, in three subfamilies (α, β, γ). Activators of herpes simplex virus can be endogenous and exogenous factors: reduction of immunoreactivity of the organism (immunodeficiency, interferon failure), physical and emotional stress, overheating or overcooling, hormonal disorders, ultraviolet irradiation, corticosteroids treatment, cytotoxic drugs. It is important to understand that the HVI is a disease of the whole body with lesions in varying degrees, all organs and systems (immune, hematopoietic, lymphatic, CNS), which is responsible for the homeostasis of the human body. These data give reason to believe HVI systemic disease, mainly affecting a particular organ. However, more is still not widely used etiopathogenetical and "topical" diagnosis, indicating the loss of any one body. Due to the fact that the clinical forms of HVI are characterized by marked polymorphism, the timely establishment of the etiologic diagnosis is a difficult task and is based on the use of specific molecular genetic, virological, immunological and serological methods. It is generally recognized that the treatment of patients with herpes is quite a challenge for practitioners, it requires professional skills in these patients, a differentiated approach depending on the clinical form of the disease, as well as the condition of the patient's immune system. Data of own observations have shown that HVI retains its relevance due to the high infection and morbidity in children (more than 30% of all children referred for advice); the need to use complex laboratory studies; the possibility of persistent currents without clinical manifestations and course of active viral replication, requiring the appointment of antiviral drugs.
Conclusions. In order to provide quality health care to patients with HVI requires knowledge of modern principles of diagnosis and therapy. Ability to herpesvirus latency and reactivation of the development of manifest forms of the disease necessitates the development of control strategies for the HVI and more efficient use of suppressive antiviral therapy and vaccine prevention.
Keywords: herpesvirus infection, etiology, clinical features in children, diagnostics

World Health Organization paid close attention to the timely detection and treatment of diabetes mellitus, since there are more than 382 million people suffering from this disease in the world. Life expectancy of patients with diabetes mellitus is twice as less when compared to their peers who do not suffer health problems and leading a healthy way of life. Based on the statistical data shows that 80% of patients on diabetes live in countries with a low standard of living. The dynamics of diabetes considered not only as a serious disease, but also as an important medical and pharmaceutical, social, economic and criminal legal problem, which is now very important for the Russian Federation, Ukraine and other countries of the world. This is because there is a constant increase in the number of patients suffering from diabetes on, with chronic diseases, the development of micro- and macrovascular complications, which lead to a reduction in life expectancy due to deterioration of its quality. At the same time the availability of the medicines for privileged categories of citizens, who suffer from diabetes mellitus in the Russian Federation and Ukraine depends on many factors. Some of these factors are improving of the management measures and control over the circulation of medicines (drugs); prevention and disease prevention; the use of personalized pharmacotherapy; ensuring the availability of essential medicines for privileged categories of citizens. Therefore, the aim of the work was to study the particularities of legal documents in Ukraine and Russia, aimed at organizing the rules regulating the circulation of the medicines used for diabetes mellitus pharmacotherapy by generalizing forensic and pharmaceutical practices related to the violation of the rights of patients with diabetes. To improve the system of measures of state control over the increasing availability of medicines for citizens of privileged contingent based on the norms of pharmaceutical law. In the study researched the particularities of legal documents in the Ukraine and Russian Federation aimed at organizing rules regulating circulation of the drugs used in the pharmacotherapy of diabetes. Found that pharmaceutical law in the field of public administration in the Russian Federation and Ukraine is the foundation and guarantor in protecting the rights of states declared the privileged category of people suffering from diabetes mellitus on unrestricted access to

essential drugs. Established that the Ministry of Healthcare of Ukraine and the Ministry of Healthcare of Russian Federation must provide scientific advice for the prevention of diabetes mellitus; update in accordance to the European standards and directives, standards of diagnosis, clinical protocols and rules of care for patients suffering from diabetes mellitus; raise public awareness about the global epidemic of diabetes; analyze forensic and pharmaceutical practice as a result of violations of the rights of patients with diabetes to ensure preferential (free) drugs. Ensuring the rights of patients with diabetes mellitus and providing vital medicines of all classification and legal groups, should base solely on the norms of medical and pharmaceutical law, the Constitution and laws of Ukraine. This will enable to the government to control the process of the licensing conditions for the implementation of activities related to the circulation of drugs among the healthcare facilities (pharmacies and hospitals).

Keywords: pharmaceutical law; medicine; diabetes mellitus; preferential population.

ТЕХНОЛОГІЯ ЛІКІВ (TECHNOLOGY OF MEDICATIONS)

ЕКСПЕРИМЕНТАЛЬНІ РОБОТИ (EXPERIMENTAL STUDY)

ХИМИЧЕСКИЙ АНАЛИЗ СЖИЖЕННОГАЗОВЫХ ЭКСТРАКТОВ СОЦВЕТИЙ ЛИПЫ

Демьяненко Д.В., Демьяненко В.Г., Дмитриевский Д.И.

CHEMICAL ANALYSIS OF DENSE-GAS EXTRACTS FROM LIME FLOWERS

Demyanenko D.V., Demyanenko V.G., Dmitriyevsky D.I.

The purpose of this work was to make qualitative and quantitative analysis of phenolic biologically active substances (BAS) in the extracts produced from lime flowers with condensed gases, using method of high-performance liquid chromatography (HPLC). **Materials and methods:** materials for this study were the extracts obtained by consequent processing of the herbal drug and marcs thereof with various condensed gases: difluorochloromethane (Freon R22), difluoromethane (Freon R32), azeotropic mixture of difluoromethane with pentafluoroethane (Freon 410A) and 3reon-ammonium mixture. Extracts obtained with the latter were subjected to further fractionation by liquid-liquid separation into hexane, chloroform, ethyl acetate and aqueous-alcohol phases. Besides, the supercritical CO_2 extract, obtained from the herbal drug under rather strong conditions (at temperature 60°C and pressure 400 bar), was studied in our previous research. Presence of phenolic BAS and their quantity in the researched samples were determined by method of HPLC with UV-spectrometric detection. **Results and discussion:** It has been found that Freon R22 extracted trace amounts of rutin from lime flowers – its content was only 0.08% of the total extract weight. On the other hand, Freons R32 and R410A showed good selectivity to moderately polar BAS of lime flowers (derivatives of flavonoids and hydroxycinnamic acids): in particular, the extract obtained with 3reon R32 contained about 1.3% of the total phenolic substances, and it was the only one of the investigated condensed gases used by us which took the basic flavonoid of lime flowers tiliroside – its content was 0.42% of extract weight. Also Freons R32 and R410A were able to withdraw another compound dominating among phenolic substances in the yielded extracts. Its quantity was rather noticeable – up to 0.87% of extract weight. This substance was not identified by existing database, but its UV-spectrum was similar to those of apigenin glucoside. Total quantities of phenolic compounds in extracts obtained with Freons R32 and R410A were 1.29% and 0.90% respectively. Freon-ammoniac extracts (hexane, chloroform, ethylacetate and aqueous-alcoholic phases in total) contained appreciable quantity of total phenolic BAS – 4.48%, among them 1.31 % was occupied by methoxycoumarins, which came into the hexane fraction. The Freon R410A modified by ammonia successfully extracted apigenin glucoside which was found in ethylacetate fraction in quantity of 0.78% that approximately 15 times exceeded content of this BAS in the extract obtained with non-modified Freon R32. Caffeic and p-cumaric acids with the total content of 0.50% (0.30+0.20% respectively) were revealed only in ethylacetate phase of 3reon-ammoniac extract. Besides, in chloroform fraction of this extract it was found unidentified substance in quantity of 1.02%. In total after consequent processing of lime flowers with studied condensed gases and their mixtures combined extracts contained 6.75% of phenolic compounds. Supercritical CO_2 was unable to take phenolic substances (this extract was previously analyzed by thin-layer chromatography and therefore was excluded from this work). **Conclusions:** Thus, some kinds of freons and also their mixtures modified with ammonia are promising extractive solvents for rather polar BAS of lime flowers, and consecutive infusion with different condensed gases allows to provide full processing of the specified herbal drug and to fractionate the substances different in their chemical composition and polarity.

Keywords: lime flowers, freons, extracts, high-performance liquid chromatography, analysis, phenolic

ДОСЛІДЖЕННЯ ПРОТИМІКРОБНОЇ АКТИВНОСТІ РЕЧОВИН (STUDY OF THE ANTIMICROBIAL ACTIVITY OF THE SUBSTANCES)

ЕКСПЕРИМЕНТАЛЬНІ РОБОТИ (EXPERIMENTAL STUDY)

ЧУТЛИВІСТЬ ДО АНТИБАКТЕРІАЛЬНИХ ПРЕПАРАТІВ ЗБУДНИКІВ ПОЗАЛІКАРНЯНИХ ІНФЕКЦІЙ

Осолодченко Т. П. , Андреєва І. Д., Завада Н. П., Лук'яненко Т. В., Батрак О. А., Рябова І. С.

SENSITIVITY TO ANTIBACTERIAL DRUGS IN AGENTS OF COMMUNITY-ACQUIRED INFECTIONS

Osolodchenko T., Andreieva I., Zavada N., Lukyanenko T., Batrak O., Ryabova I.

Introduction The widespread and uncontrolled use of antibiotics leads to selection of resistant strains and rise to atypical forms of most infectious agents. Constantly progressive resistance of microorganisms is currently the most important negative phenomenon of antibiotic therapy. The aim of the work was to optimize antibiotic therapy in community-acquired infections. The objective of study was to determine the range and degree of resistance in clinical isolates of microorganisms of different taxonomic groups, obtained from patients in outpatient care. **Material and methods** 213 clinical isolates of microorganisms obtained from patients in outpatient care were studied: 34,7 % strains were obtained from patients with inflammatory processes in upper respiratory tract, 11,7 % – with ear inflammation, 36,6 % – with inflammatory diseases of urinary and genital tracts, 11,3 % – with of skin and soft tissues inflammation, 4,2 % – eye inflammation and 1,4 % – with postoperative infectious complications. The collection of clinical material was performed accordingly before the start of antibacterial therapy. Microorganisms' isolation and identification were carried out with the help of microbiological methods according to the regulatory documents. The study of resistance of bacterial strains to the

antibacterial drugs was performed with the help of disc diffusion method on the Muller-Hinton nutritional medium and of fungal strains – on Saburo medium with the use of standard commercial discs. **Results and discussion** The array and level of resistance to antibacterial drugs in clinical isolates of microorganisms of different taxonomic groups obtained from patients in outpatient care was established. The research has established that 43,3 % *Staphylococcus spp.* isolates possessed polyantibiotic resistance and 3,8 % – extensive resistance, only sensitivity to aminoglycosides and glycopeptides was preserved. The majority of beta-haemolytic streptococci was moderately resistant to macrolides (85,7 %), levofloxacine (52,4 %) and chloramphenicole (66,7 %) and resistant to clindamycine (90,5 %). All isolates of *E. faecalis* demonstrated moderate resistance to II and III generation nitrofurane and chinolone derivatives and a quarter of isolates – to ampycilline. More than a half of clinical isolates of *P. aeruginosa* (58,3 %) demonstrated polyantibiotic resistance. A quarter of all obtained isolates of *P. aeruginosa* possessed extensive resistance, preserving sensitivity to only monobactames and carbapenemes. Among *Enterobacteriaceae* spp. 44,4 % of strains were polyresistant. One strain of *E. coli* isolated from genital tract had extensive resistance. The majority of studied *C. albicans* fungal strains were sensitive to all studied antifungal agents. The percent of strains resistant to antifungal agents was between 8,6 and 17,1 %. **Conclusion** In 30,5 % of all studies clinical isolates multiple drug resistance was observed. Polyantibiotic resistance was show in 58,3 % *P. aeruginosa* isolates, 44,4 % *Enterobacteriaceae* spp. strains and in 43,3 % studied *Staphylococcus spp.* isolates. According to the study results, the significant portion of antibiotic resistant and polyresistant strains of *Staphylococcus spp., P. aeruginosa* and microorganisms of *Enterobacteriaceae* family circulating in outpatient conditions are probable producers of beta-lactamases.
Key words: microorganisms, antimicrobial drugs, resistance to antibiotics

ПРОТИМІКРОБНА АКТИВНІСТЬ НАНОЧАСТИНОК ХІТОЗАНУ, ЛЕГОВАНИХ Ag^+, Cu^{2+}, Zn^{2+}, Mg^{2+} ІОНАМИ

Суходуб Л.Б.

ANTIMICROBIAL ACTIVITY OF Ag^+, Cu^{2+}, Zn^{2+}, Mg^{2+} IONS DOPED CHITOSAN NANOPARTICLES

Sukhodub L.B.

Modification by polymers and inorganic ions of the bioactive materials for orthopedic implants with the purpose of initiating controlled reactions in tissues that surround the implant, is one of the modern approaches in medical materials. A key feature of functional polymers is their ability to form complexes with various metal ions in solution. Chitosan is natural biopolymer with pronounced affinity to transition metal ions. Some researches prove the higher antimicrobial activity of Chitosan-metal complexes compared with pure Chitosan. The purpose of this work was the study of antimicrobial activity of Chitosan nanoparticles modified by metal ions Ag^+, Cu^{2+}, Zn^{2+}, Mg^{2+} against reference strains *S. aureus* 25923 ATSS, *E. coli* ATCC 25922, *C. albicans* ATCC 885653 for their further use as components of the composite biomaterials for medical purpose. Chitosan nanoparticles suspension was prepared by known method based on the ionotropic gelation between chitosan and sodium tripolyphosphate. To obtain Chitosan-metal nanoparticles to the Chitosan suspension were added the corresponding metal ions aqueous solutions in quantity to match the concentration of metal ions of 200 ppm . Antibacterial activities of Ag^+, Cu^{2+}, Zn^{2+}, Mg^{2+} ions doped Chitosan nanoparticles, pure Chitosan nanoparticles, metal ions and 1% (v/v) acetic acid solution (it was used as solvent for Chitosan) against bacteria were evaluated by determination of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) *in vitro*. Muller–Hinton (MH) broth and MH agar (Russia) were used as growth media. The bacteria suspension for further use was prepared with concentration that corresponded 0,5units by McFarland scale. The MIC was determined by a broth dilution method. The results were read after 24 hours of experimental tubes incubation at 37 ºC as equivalent to the concentration of the tube without visible growth. To evaluate MBC, a sample of 0,1 ml was transferred from each tube without visible growth to a MH agar plate and incubated at 37 ºC for another 24 hours. The MBC was determined as the concentration of the tube without bacterial growth. Results showed that antibacterial activity of the ion metal loaded Chitosan nanoparticles was higher than that of pure Chitosan nanoparticles and significantly higher than antibacterial activity of the metal ions. The acetic acid MIC was highest and there is the evidence of the nanoparticles antibacterial action, but not of the solvent. The most sensitive to all investigated samples was gram-negative microorganism *E. coli ATCC 25922*, the most stabile – funge *C. albicans ATCC 885653*. So, for example, Silver nanoparticles compared with pure Chitosan nanoparticle were at 8, 4, 2 times more active against *E. coli, S. aureus, C. albicans* respectively, as compared with the Ag^+ ion antibacterial activity – at 5, 40 and 10 times respectively. Adding copper ions Cu^{2+} to Chitosan nanoparticles increased their antimicrobial action against *S.aureus* compared with pure Chitosan nanoparticles in 4 times, but it does not affect antimicrobial activity against the other two of the microorganisms. Addition of zinc (Zn^{2+}) and magnesium (Mg^{2+}) ions increased antimicrobial activity against *E. coli* in 2 times. The results of this study suggest about the perspective of Ag^+, Cu^{2+}, Zn^{2+} **ions doped Chitosan nanoparticles applications as the antimicrobial component to composite materials for medical purpose.**
***Key words*:** Chitosan, nanoparticles, metal ions, microbial strains *S. aureus* ATCC 25923, *E. coli* ATCC 25922, *C. albicans* ATCC 885653, antimicrobial activity

ВИПРОБУВАННЯ ЕФЕКТИВНОСТІ АНТИМІКРОБНИХ КОНСЕРВАНТІВ ПРЕПАРАТУ «ЕФІАЛЬ»

Борщевський Г. І., Раілко З. О., Рейда В. П.

THE EFFECTIVENESS OF ANTIMICROBIAL PRESERVATIVES TESTING OF THE MEDICINE "EFIAL

Borshchevskiy G. I., Railko Z. O., Reida V. P.

Dosage form - spray is one of the most advanced and modern methods of medicines administration in the human body. The advantage of airborne mode of medicines delivery (inhalation) than injection and enterable methods is the ability to direct and rapid impact on the area of inflammation of the mucous membranes or when fine evaporation - on the bronchi and lungs. When finished medicinal product itself has not a sufficient antimicrobial activity, in its composition can be administered antimicrobial preservatives, which is especially important for medicines as aqueous solutions. Because microbial contamination can cause infection of the patient or damage to the finished product, antimicrobial preservatives are designed to prevent microbial contamination of the finished medicinal product during storage and use, especially in the case of multi-container packaging. Rationale of composition and technology of spray "Efial" was conducted by us using physical, chemical and technological methods. An important task in creating new medicines is the study of preservatives choice. The **aim** of this work is to test the effectiveness of antimicrobial preservatives of spray "Efial". **Material & methods** The object of the test – **"**Efial"containing preservatives on the lower: series 10814 (holding inoculated samples at a temperature of 20-25 º C) and series 10914 (holding inoculated samples at 2-8 º C). Materials: 1. Nutrient medium: soy-casein agar, sabouro-dextrose agar. 2. Solutions: buffer solution of sodium chloride and peptone pH =7.0, containing 50 g/l of polysorbate-80, 5 g/l of lecithin, 1 g/l of histidine hydrochloride. Test-microorganisms: *Staphylococcus aureus ATCC 6538; Pseudomonas aeruginosa ATCC 9027*; *Candida albicans ATCC 10231; Aspergillus brasiliensis ATCC 16404.* Preparation of inoculums was carried by State Pharmacopoeia of Ukraine, p. 5.1.3. **Results & discussion** The checks of methods for determining total viable microorganisms suitability have been carried out. It was proved that the method of

surface sowing on cups of 1 ml of medicine's dilution 1:10 is suitable for determining the number of microorganisms in 1 ml and can be used during the test effectiveness of antimicrobial preservatives. Further tests of efficacy of antimicrobial preservatives in the product "Efial": s. 10 814 (holding inoculated samples at a temperature of 20-25 °C) and s. 10914 (holding inoculated samples at 2-8 °C) were conducted. The test results showed that in storage of the inoculated medicine's samples at 2-8 °C, there is no significant change in the number of viable cells of the test microorganisms as compared to the original number: it is marked a tendency to a slight decrease in the number of viable test microorganism *Pseudomonas aeruginosa* and *Staphylococcus aureus* on day 7 and 14 that do not meet the admissibility of the effectiveness of antimicrobial preservative according criteria A and B; it is marked a tendency to a slight decrease in the number of viable test microorganisms *Candida albicans* and small increase in the number of viable test microorganisms *Aspergillus brasiliensis* on day 14 that do not meet the admissibility of the effectiveness of antimicrobial preservative according criteria A and B. At the same time, medicine's samples during storage at 2-8 °C, they are not an increase in the number of microorganisms within 28 days. **Conclusions.** Testing the effectiveness of antimicrobial preservatives (sodium salt propylparahydroxybenzoate - 0.18 mg / ml sodium methylpara-hydroxybenzoate - 1.62 mg / ml) in sprays "Efial." It is proved that the chosen preservatives ensure microbiological purity of the drug during storage at 2 to 8 ° C. To ensure proper microbiological purity of the drug during its use after opening the primary packaging, the following measures: • introduced filtration through a filter with a pore size of 0.22 microns, which provides a necessary degree of microbiological purity of the drug; • set the storage mode at 2 to 8 ° C - which is not the reproduction of microorganisms in the sample; • limited term use of the drug after opening - up to 7 days.
Keywords: spray, antimicrobial preservatives, bacteria, culture media, medicine.

ОПРЕДЕЛЕНИЕ АНТИМИКРОБНОЙ АКТИВНОСТИ СПИРТОВОДНЫХ ВЫТЯЖЕК ИЗ НЕКОТОРЫХ ВИДОВ РАСТИТЕЛЬНОГО СЫРЬЯ СОДЕРЖАЩЕГО ДУБИЛЬНЫЕ ВЕЩЕСТВА

Бойко Н. Н. , Зайцев А. И. , Осолодченко Т. П.

DETERMINATION OF ANTIMICROBIAL ACTIVITY OF ETHANOLIC EXTRACTS FROM SOME KINDS OF RAW MATERIALS WITH TANNINS

Boyko N.N., Zaytsev A.I., Osolodchenko T.P.

This paper presents data about determination of antimicrobial activity of extracts from some kinds of raw materials (13 plants) with tannins. It was determined some kinds of technological parameters of extracts (concentration of total solids and density). A simple to use valuation method of antimicrobial properties of extracts – well method has been suggested and applied; for quantitative estimation of antimicrobial activity of extracts and compare them with each other, special mathematic method (vector algebra theory) has been applied. It was determined parameters of antimicrobial properties of extracts: a complex indicator of medication antimicrobial activity for quantitative estimation of antimicrobial effect - A, and correlation coefficient - r (degree of similarity to the standard), which demonstrate the spectrum of antimicrobial activity of medication. It has been selected the most promising extracts that have the medium antimicrobial activity, which obtained from the root of bergenia crassifolia A=1.89; the root of potentilla erecta A=1.92; the bark of corylus avellana A=1.76; the leaf of cotinus coggygria A=2.21. Low level of antimicrobial activity has been demonstrated by the extract obtained from the cone of alnus incana A=0.78, r=0.58. It is noted antimicrobial properties of the solutions of tannin and gallic acids 0.5% m / m in 70% vol. ethanol, that showed respectively moderate and low strength antimicrobial properties: A=1.65, r=0.99 and A=1.26, r=0.91. This potentially allows to predict the antimicrobial properties of extracts from plants containing derivatives of tannin and gallic acids on their concentration in them. It has been shown in general that raw materials that contain different kinds of tannins have possibility to use in complex phytochemical medications as antimicrobial component.
Keywords: antimicrobial activity, raw material, extracts, tannins.

АНТИСТАФІЛОКОКОВА АКТИВНІСТЬ ЛІПОСОМАЛЬНОЇ ФОРМИ ЛІНКОМІЦИНУ

Деркач С.А., Коцар О.В., Іванова Н.М., Воронкіна І.А., Крилова І.А.

ANTISTAPHYLOCOCCAL ACTIVITY OF LIPOSOMAL FORMS OF LINCOMYCIN

Derkach S.A., Kotsar O.V., Ivanova N. N., Voronkyna I.A., Krylova I.A.

Nowadays the vital problem of modern medicine is a tendency to emerging of both nosocomial and community-acquired strains before antibiotic resistance forming. The complexity of antibiotic therapy of diseases caused by methicillin resistant staphylococci having high poly resistance almost to every classes of antibacterial agents is of prime importance. One of the ways to improve antibacterial preparations still remains the development of their liposomal forms. This work studies anti-staphylococcal activity (according to MIC) of the liposomal form of lincomycin developed in the Institute of Dermatology and Venereology of Ukraine by Ivanova N. N., the Candidate of Chemical Sciences.The purpose of this research work was to study liposomal inhibiting concentration of the liposomalny form of lincomycin and a commercial preparation lincomycin (produced by CJSC "Pharmaceutical firm "Darnitsa"). Determination of the minimum inhibiting concentration was carried out by a tablet micromethod by consecutive cultivations of the samples under study.It is shown that MIC of liposomal lincomycin is eight times as low as usual lincomycin (0,23mkg/ml to 1,87 mkg/ml). Antibacterial activity of the liposomal form of lincomycin is studied concerning the patients selected from the different biotopes with pyo inflammatory diseases of staphylococcus strains (15 strains –methicillin sensitive, 12 strains - methicillin resistant).It is shown authentically the higher sensitivity of *S. aureus* strains to the liposomal form of lincomycin in comparison with usual lincomycin . Also 50.0% of MRSA strains were sensitive to the liposomalny form of lincomycin that shows the perspective for the development of the liposomal forms of antibiotics to cure staphylococcal infections.
Key words: liposomal forms of antibiotics, lincomycin, antibiotics sensitivity, staphylococcus

МЕДИЦИНА. МІКРОБІОЛОГІЯ (MEDICINE. MICROBIOLOGY)

ЕКСПЕРИМЕНТАЛЬНІ РОБОТИ (EXPERIMENTAL STUDY)

ВИЗНАЧЕННЯ НЕОБХІДНИХ РЕЖИМІВ УЛЬТРАФІОЛЕТОВОГО ОПРОМІНЮВАННЯ, ЯКІ ЗАПОБІГАЮТЬ ВИЖИВАННЮ *MYCOBACTERIUM TUBERCULOSIS* ТА ЇХ ПЕРЕТВОРЕННЮ В L-ФОРМИ

Моісеєнко Т. М., Волянський А. Ю., Ковальова Г. О.

DEFINITION DESIRED MODE ULTRAVIOLET RADIATION, WHICH PREVENT *MYCOBACTERIUM TUBERCULOSIS* SURVIVAL AND CONVERSION TO L-FORMS

Moiseenko T. N. Wolyanski A. Y., Kovaleva A. A

Bactericidal effect of ultraviolet (UV) rays was first described over 100 years ago. UV was used in hospitals from 1930 and in 1936 was first used to sterilize the air in the operating room. The maximum bactericidal effect occurs in the region 254-257 nm UV wavelength, which is manifested mainly in the destructive-modifying photochemical damage of DNA synthesis. So, UV rays causes an increase in the permeability of the microbial cell membranes to ions environment and coagulation of colloids cytoplasm, resulting in disruption of normal cell development, stopping the reproduction and lysis. In any body there are biochemical mechanisms that could fully or partially restore the damaged original structure of the DNA molecule - fotoreactivation. It's resistant microorganisms consist about 0.01% of the microbial population, but the certain types reach 1-5%. Surviving bacteria can form new colonies with less susceptibility to radiation. Mycobacteria in the course of evolution developed various mechanisms to overcome or inactivation of adverse environmental factors: a special cell wall (waxes, fats, mycolic acid); large metabolic capabilities by which *M. tuberculosis* able to inactivate various antiseptics and disinfectants; morphological plasticity, which is spontaneous and induced transformation in L-forms with a reversion of virulent original shape. *M. tuberculosis* more resistant to UV radiation than other bacteria. **Materials and methods.** We investigated the effectiveness of UV radiation against to *M. tuberculosis* at distances from the radiator - 70 cm, 140 cm, 210 cm; exposure time 20, 30, 40 and 50 minutes. We used museum strain H37Rv and 3 clinical strains: 1 - strain with preserved sensitivity; 2 - strain with resistance to isoniazid and rifampicin; 3 - strain with resistance to isoniazid, rifampicin and ofloxacin (enhanced resistance). We used radiator - Philips TUV power 30 W (without ozone for up to 6000 hours). Control and irradiated cultures of the pathogen were grown in the media of Levenstain-Yensen, Blood media of Shkolnikova and medium VCG to detect L-forms. For the accuracy of the results, each experiment was performed in 6 series was set down three times (at intervals of 30 days). **Results and discussion.** UV using for 20 minutes almost 1/5 of *M. tuberculosis* it caused survival (21,60 ± 1,83%); at 30-minute UV (standard exposure time) - 13% *M. tuberculosis* remain viable; 3,24 ± 1,28% remain viable even 40 minutes of ultraviolet irradiation. Only by increasing the time to 50 minutes to achieve sufficient efficacy in destroying vegetative forms, but even this term may not be enough to prevent the formation and survival of L-form (1,08 ± 0.91% in the medium VCG). The effective exposure time vegetative forms of мycobacterium 40 minutes at a distance of 70 cm, at least 50 minutes at a distance of 210 cm. The effective exposure time to prevent the survival of L-form is at least 50 minutes at a distance of 70 cm. **Conclusion**. The UV irradiation causes the L-transformation of the bacteria. This phenomenon detected on VKG media. The formation of L-forms and the possibility of reversion to consider when using UV. Among the experimental crops more resistant compared to the referent strain differed clinical isolates with the presence of resistance to anti-TB drugs.

Key words: *M. tuberculosis,* ultraviolet rays, L-form

АНТИКОМПЛЕМЕНТАРНА АКТИВНІСТЬ МІКРОФЛОРИ, ВИДІЛЕННОЇ З КИШКІВНИКА У ОСІБ З НАДМІРНОЮ ВАГОЮ ТА СЕРЦЕВО-СУДИННОЮ ПАТОЛОГІЄЮ

Литвиненко О. А., Осолодченко Т. П., Кучма І. Ю., Савченко Ю. Г.

ANTICOMPLEMENTARY ACTIVITY OF THE MICROFLORA OF THE INTESTINE IN PEOPLE WHO ARE OVERWEIGHT AND CARDIOVASCULAR PATHOLOGY

Osolodchenko T.P., Lytvynenko O.A., Kuchma I.Y., Savchenko U.G.

One of the main factors of progression of obesity in the world is the change of the style of nutrition. In the last decade, studies have shown that a change in the dietary structure leads to changes in intestinal biocoenosis. It has been stated that fatty food increases the number of gram-negative bacteria. In turn, gram-negative bacteria, directly through lipopolysaccharide of the outer membrane may be triggers of slowly progressive systemic inflammation. **Material & methods.** 227 strains of microorganisms from patients with various degrees of obesity were the object of the research. Also, the 63 strains from the control group with normal weight were studied. Anticomplementary activity (ACA) of microorganisms was studied according to the "three-layer" method using complement in concentration of 5 - 10 - 20 hem.unit/mL and the indicator crop of E. coli SISC, N212, highly sensitive to the bactericidal action of the complement. **Results & discussion.** As a result of the study of ACA of microorganisms it was found that genus *Candida spp* possessed the most pronounced activity. Gram-negative bacteria, such as *Enterobacter spp* and *E. coli* also showed pronounced ACA. The strains from the control group had slightly lower index. E. coli also showed ACA in 100,0 % of cases at the concentration of the complement of 5 hem.unit/mL. But with increasing concentrations to 10 and 20 hem.unit/mL figures differ slightly. The genus *Enterococcus spp*. has also differences in the percentage of active strains. Thus, it was found that 10% of strains of the experimental group and 25,0 % of strains of the control group did not have the ACA. Strains of the experimental group inactivated the complement at the concentrations of 5, 10, 20 hem.unit/mL in 90,0 %, 72,5 % and 70,0 % of samples respectively, and strains of the control group inactivated the complement in 75,0 %, 31,25 % and 6,25 % respectively. The study found that lakto- and bifidobacteria have ACA in a small percentage of cases. Thus, 66,67 % of lactobacilli and 68,59 % of bifidobacteria did not have the ability to inactivate the compliment, but 33,33 % of lactobacilli and 31,48 % of bifidobacteria were able to inactivate the complement at the concentration of 5 hem.unit/mL. The percentage of strains that inactivated the complement at the concentration of 10 hem.unit/mL was 20,83 % of lactobacilli and 11,1 % of bifidobacteria. ACA was absent in 80,95 % of lactobacilli from people with obesity without comorbidity. In obese hypertension patients this percentage was 56,25 %, and if the patient had IHD, the percentage decreased to 14,29 %. The percentage of bifidobacteria representatives which did not have the ability to inactivate the complement taken from people without cardiovascular pathology was 76,92 %. In people suffering from hypertensive disease, it dropped slightly to 58,82 %, and if people had IHD, it increased to 81,82%. **Conclusion.** 1. The representatives of intestinal

microflora from people with different weight have different ability to inactivate the complement. The most likely reason for it is the changing nature of modern human nutrition. 2. Gram-negative intestinal microflora has the most distinct ability to inactivate the complement, which may indicate its role in the development of chronic inflammation of low-grade activity in patients with obesity. 3. Naturally, intestinal microflora in a small percentage (33,33 % of lacto- and 31,48 % of bifidobacteria) has the ability to inactivate the compliment. Increase of ACA of lactobacilli and decrease of ACA of bifidobacteria from patients with concomitant cardiovascular pathology can be explained by the influence of comorbidity on the biological properties of microflora as well as taking a large number of medicine by this group of patients for the treatment of hypertensive disease and ischemic heart disease, the influence of which on normal intestinal microflora is not sufficiently studied at present and requires a further study.
Key words. Anticomplementary activity, microflora, obesity.