ABSTRACT&REFERENCES

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EFFECT OF ZINC AND ACETATE TRIGONELLA FOENUM GRAECUM ON THE METABOLISM OF NITRIC OXIDE IN RATS WITH ALCOHOL DEPENDENCE FORMED BRAIN

p. 4–8

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The influence of zinc acetate and fenugreek (Trigonella foenum) on the metabolism of nitric oxide in the brain of rats with formed alcohol dependence was investigated. To determine the activity of NO-synthase and its' isoforms (cytokine-dependent iNOS and Ca^{2+}-dependent cNOS) in brains of rats with formed alcohol addiction. To measure the level of NO_2^-, NO_3^- and S-nitrosothioles in brains of rats with formed alcohol addiction. To study the effects of zinc acetate and Fenugreek (Trigonella foenum graecum) on activity of NO-synthase and its' isoforms (cytokine-dependent iNOS and Ca^{2+}-dependent cNOS) and level of NO_2^-, NO_3^- and S-nitrosothioles in brains of rats with formed alcohol addiction.
It was shown that under conditions of consumption of alcohol the appropriate links of NO cycle were activated: NO-synthase (by means of cytokine-dependent iNOS and Ca^{2+}-dependent NO-synthase isoforms in terms of initial studies: 1-4 weeks) and NO deposition as nitrosothiols

Keywords: *alcohol dependence, fenugreek, zinc acetate, metabolism, nitrosothiols, conditions of consumption, brain*

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THE STUDY OF BONE MARROW CELLS IN RATS ACCORDING TO THEIR AGE AND CALORIC INTAKE

p. 9–13

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The bone marrow is a central organ of haemopoiesis and a source of pluripotent hemopoietic stem cells. The age-related changes in bone marrow induce the disorder of coordination between parenchyma and stroma of the organ that negatively influences proliferative potential and differentiation of the cells. That is why it is urgent to study the age-related changes of bone marrow and influence of caloric intake limitation on it.

***Aim**. The aim of presented work was the study of proliferative potential, index of viability and percentage ratio of the bone marrow cells in rats depending on their age and caloric intake.*

***Methods**. The following methods were used in the study: selection and cultivation of the bone marrow stem cells, assessment of proliferative potential and viability of cells, analysis of percentage ratio of cellular types.*

***Result**. It was established, that the number of cells in bone marrows increases with age. The limitation of caloric intake favors the decrease of cells number in bone marrow despite the rats' age. The received data demonstrated that the limitation of caloric intake increases the proliferative potential of the bone marrow only in old animals. It was established, that the viability of bone marrow cells was high during all period of cultivation. The morphological population of bone marrow cells in rats of different age was heterogenic, not depending on the conditions of their feeding. It was demonstrated, that the limitation of feeding caused the increase of the number of non-differentiated blasts in bone marrow of old animals that can be connected with the activation of the processes of self-activation of stem cells pool and non-differentiated predecessors of immune system cells. The morphological analysis of the bone marrow cells culture of all animal groups despite the age and nutrition regime demonstrated that the cultivation favors the selective decrease of cells heterogeneity. At that the cells of erythroid and megakaryocytic sprouts were absent in cellular cultures.*

***Conclusions**. As a result, the limitation of caloric intake of old rats favors the restoration or activation of proliferative potential of immunocompetent cell of bone marrow in vitro system*

***Keywords:** cells, bone marrow, age, caloric, restriction, culturing, proliferation, viability, differentiation, myelogram*

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THE EFFECT OF VINCRISTINE ON MORPHO-FUNCTIONAL STATE OF NEURONS OF CEREBROSPINAL SENSITIVE GANGLIONS IN EXPERIMENT

p. 14–17

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Vincristine is a preparation of vegetable generation, gotten from the vegetable rose myrtle (Vinca rosea L.), belongs to the group of chemotherapeutic preparations with expressed neurotoxicity. The active use of vincristine in the treatment of malignant tumors, especially in child age, conditions the study of influence of this preparation on peripheral nervous system. In this connection we studied morpho-functional state of neurons and gliocytes of rat cerebrospinal ganglion under effect of vincristine in experiment.

***Aim of the work** – to study the morpho-functional state of neurons and gliocytes of sensitive cerebrospinal rat ganglion under effect of vincristine in experiment.*

***Task of research** – to reveal the disorder of structural components of sensitive cerebrospinal ganglion, conditioned by vincristine use.*

***Methods of research.** The complex of light optical, morphometric and electromicroscopic methods of research was used to reveal the effect of vincristine use on structural components of sensitive cerebrospinal ganglion. The experimental study was carried out on 31 rats of both sexes (16 – experimental and 15 control ones) with mass 200,0–220, 0 g. The animals were kept in vivarium with free access to the food and water according to bioethics requirements as to the treatment of experimental animals, testified by correspondent act of bioethical expert opinion.*

***Results of research.** The features of vincristine use in oncology for treating patients with malignant tumors of different organs and systems of organism and also the side effects of this preparation were considered. On the base of gotten electromicroscopic data we established the vincristine effect on the nervous structures of sensitive cerebrospinal ganglion in pathogenesis of vincristine-induced peripheral neuropathy. Thus, during the experiment there was observed the expressed sensitivity of neurons of sensitive cerebrospinal ganglions to the toxic effect of preparation. The big neurons suffer most, the small ones – least.*

***Conclusions.** It was established, that vincristine effect is manifested by the disturbance of neurotubes and neurofilaments in esodic neurons with lesion of protein-synthesizing organobodies*

***Keywords:** vincristine, neurotoxicity, cerebrospinal ganglion, neurons, gliocytes, neurotubes, neurofilaments, stage, disorder*

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THE ANALYSIS OF COHERENT EEG ACTIVITY IN PERSONS WITH DIFFERENT PROFILES OF INTER-HEMISPHERIC ASYMMETRY DURING ENCODING THE RHYTHM PATTERNS

p. 17–21

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There were studied the changes of coherence of encephalogram of brain cortex in 170 men and women with right-side and left-side profiles of auricular asymmetry during auricular perception and manual reproduction (processing) of rhythm patterns. It was established, that the coherence of EEG fluctuations mainly increases in θ-, α- and β-diapasons of EEG in temporal, central and parietal zones of cortex during encoding of mono- and polyphonic rhythm patterns in examined groups. The local decrease of coherence of α- and β-fluctuations was revealed during encoding of rhythm patterns in frontal zones, especially in right-profile women and left-profile persons. The cerebral processes at the increase of coherence in studied groups are provided by integration of excitation processes in zones of encoding of sensor and motor information. The decrease of coherent connection between frontal branches demonstrates the decrease of directed influence of pre-frontal cortex on the zones of processing of sensor and motor information at the period of activity of last ones. The role of such changes is more in women with right-side asymmetry profile and in persons with left-side one

Keywords: *electroencephalography (EEG), coherence, rhythm perception, rhythm patterns, individual asymmetry profile*

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THE COMPARATIVE MORPHOLOGICAL ANALYSIS OF SPECIES ARCTIUM L. (ASTERACEAE) OF UKRAINIAN FLORA

p. 22–25

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The aim of the work is to analyze several morphological signs of Arctium plants of Ukrainian flora and to carry out their comparative analysis using the method of determination of the measure of discrepancy by the separate parameters and similarity measure, offered by Shmidt. For comparison there was used the normalize deviation and coefficient of signs divergence. The putting of normalize deviation on the graph gives the visible presentation about the divergence measure of signs of studied objects. The graphs of normalize deviations of morphometric signs of Arctium species relative to A. Lappa standard were constructed on the base of received results. Among the sings of Arctium plants were used the ones that had reliable deviations relative to the standard. The analysis of values of divergence coefficient showed the measure of general similarity of the whole complex of studied signs relative to the standard values. As a result of research it was revealed, that the species A. nemorosum and A. Lappa are most similar by morphological parameters; in A.minus and A. tomentosum were revealed the maximal deviations of the signs. It allowed use these signs at diagnosis of interspecific differences and for the supplement of existing keys

Keywords: *morphological signs, morphological analysis, species, Arctium, Shmidt's method, medicinal plants, measure of discrepancy*

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THE STATE OF NATURAL LEPTOSPIROSIS CELLS ACTIVITY AND FUNCTIONING IN THE DRY STEPPE ZONE OF THE NORTHWEST BLACK SEA REGION

p. 25–31

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The territory of arid steppe terrain in climate and landscape social conditions largely determines the capacity and activity of local cells of leptospirosis.
The features of enzootic functioning of cells in different landscape areas have the key meaning in the epidemic estimation of the territory that requires detailed knowledge of ecological, landscape and biocenotical geographical specificity of circulation circles of pathogen leptospirosis. On the basis of serological control of rodents and reporting data of laboratories SES about the results of analytical studies was made the analysis of eco-social nature of epizootic manifestations of natural infection in the region and established that a key role belongs to economic and socio-economic factors, the effect of which covers the entire research area and changes spatial, structure and etiological structure of natural cells of leptospirosis

Keywords: *enzootic functioning, cells, leptospirosis, natural infection*

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THE ANALYSIS OF BIOLOGICAL WAYS OF RESTORATION OF THE OIL-CONTAMINATED SOILS

p. 31–39

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The aim of the article was the analysis of modern biological methods of restoration of oil-contaminated soils and possibilities of their use at the early stages of elimination of oil-contamination. The effective biological ways of restoration of contaminated soils include bioremediation and phytoremediation. The methods of bioremediation provide the activization of existing microflora by creation of optimal conditions at the expanse of tillage, mellowing, introduction of mineral manures, sorbents and other or use of microorganisms-oil-destructors, introduced in contamined soil in significant amounts. Bioremediation utilizes the oil hydrocarbons rather successfully. But this method has a series of disadvantages, especially – many stages, high cost prices, conditioned by additional expenditures for preparatory works and for creation of the optimal conditions of bioremediation. At the same time the artificial introduction of microorganisms in oil-contaminated soils is connected with certain biological risk. The methods of phytoremediation are effective and attractive because of their naturaless, eco-friendliness, easiness and economy, are characterized with longer influence and stable improvement of environmental situation. The analysis of literary data demonstrated that the prospective plants for restoration of oil-contaminated soils are legumes, able to assimilate the nitrogen of atmosphere, perennial herbal plants and stable arboreal species, able to symbiosis with nitrogen-fixing microorganisms.

The analysis of the literary sources of biological ways of restoration of oil-contaminated soils indicates the prospectiveness of phytoremediation methods using perennial actinorhizal plants, especially sea buckthorn that can be used independently for restoration of oil-contaminated soils. This methos is characterized with economy, esthetics, relative easiness of realization, possibility of usage on big areas and prolongation of effect. Phytoremediation of oil-contaminated soils using sea buckthorn alongside with cleansing of pollutants provides the improvement of physical-chemical and biological properties of soil, prevents erosion, restrains the penetration of harmful substances in air, soil and underground water that provides the stable restoration of natural ecosystems

Keywords: *oil-contaminated soils, bioremediation, phytoremediation, microorganisms-oil-destructors, plants-remediants, degradation of lands, restoration of soils*

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THE ANALYSIS OF VITALITY STRUCTURE OF *CHIMAPHILA UMBELLATA* (L.) W. Barton CENOPOPULATIONS IN FOREST PHYTOCENOSES OF THE NOVGOROD-SIVERS'K POLISSIA

p. 40–45

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The population analysis included nine Chimaphila umbellata cenopopulations from different groups, typical for Novgorod Siver'sk Polissia: Pinetum (sylvestris) pleuroziosum (schreberi), Pinetum (sylvestris) callunoso (vulgaris)-pleuroziosum (schreberi), Pinetum (sylvestris) vaccinioso (myrtilli)-pleuroziosum (schreberi), Pinetum (sylvestris) convallarioso (majalis)-pleuroziosum (schreberi), Pinetum (sylvestris) franguloso (alni)-vaccinioso (myrtilli)-pleuroziosum (schreberi), Pinetum (sylvestris) sorboso (aucuparii)-convallarioso (majalis)-pleuroziosum (schreberi), Querceto (roboris)-Pinetum (sylvestris) pleuroziosum (schreberi), Pineto (sylvestris)-Betuletum (pendulae) vaccinioso (myrtilli)-pleuroziosum (schreberi), Betuletum (pendulae) vaccinioso (myrtilli)-pleuroziosum (schreberi).

The aim of research was to explain the features of vitality structure of Chimaphila umbellata cenopopulations in aforesaid forest phytocenoses of studied region.

The morphometric analysis, attended by the assessment of 17 morphometric parameters in Chimaphila umbellata plants was used during the research. In the same time the algorithm of vitality analysis, attended by determination of correlations between morphoparameters and estimation of their factor loads, was realized.

It was established, that in Chimaphila umbellata plants at the level of correlation r=0,85 and higher, the dimensional values form four pleiads. Most factor loads were registered in indices of leaves mass, general area of leaf surface, general phytomass, number of leaves, photosynthetic effort and also ratio between the area of leaf surface and phytomass. On the base of combination of correlative and factor solution among the totality of morphoparameters that characterize the state of Chimaphila umbellata ramets of generative ontogenetic state we fixed the dimensional parameters that determine the vitality of plant of this specie: general phytomass of plants, general area of leaf surface and photosynthetic effort.

The results of vitality analysis testified that Chimaphila umbellata cenopopulations are rather diverse by vitality structure. Their signs correspond to all three vitality types: depressive, moderate and flourishing. The depressive one is cenopopulation from the group Pinetum (sylvestris) vaccinioso (myrtilli)-pleuroziosum (schreberi). The moderate include cenopopulations from the groups Pinetum (sylvestris) callunoso (vulgaris)-pleuroziosum (schreberi), Querceto (roboris)-Pinetum (sylvestris) pleuroziosum (schreberi), Pineto (sylvestris)-Betuletum (pendulae) vaccinioso (myrtilli)-pleuroziosum (schreberi), Betuletum (pendulae) vaccinioso (myrtilli)-pleuroziosum (schreberi). The flourishing ones are cenopopularions from the groups Pinetum (sylvestris) pleuroziosum (schreberi), Pinetum (sylvestris) convallarioso (majalis)-pleuroziosum (schreberi), Pinetum (sylvestris) franguloso (alni)-vaccinioso (myrtilli)-pleuroziosum (schreberi), Pinetum (sylvestris) sorboso (aucuparii) -convallarioso (majalis)- pleuroziosum (schreberi).

The belonging to three different vitality types testifies to the different degree of favorableness of one or another location as to the formation and existence of cenopopulation of this specie. Based on the signs of vitality structure, the least favorable are the ecological-cenotic conditions of Pinetum (sylvestris) vaccinioso (myrtilli)-pleuroziosum (schreberi) group, and most favorable - Pinetum (sylvestris) pleuroziosum (schreberi) and Pinetum (sylvestris) franguloso (alni)-vaccinioso (myrtilli)-pleuroziosum (schreberi)

Keywords: *cenopopulation, vitality, vitality structure of cenopopulations, quality index, Chimaphila umbellata*

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THE DISTRIBUTION OF SPINAL EVOKED POTENTIALS ACROSS DORSAL SURFACE IN CONDITIONS OF DORSAL ROOTS TRANSECTION

p. 45–50

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The aim of experiments on the cats was determine specificity the distributions evoked potentials (EP) of the spinal cord (SC) across dorsal surface in lumbar segments before and after dorsal roots transection.

We used a standard electrophysiological techniques abduction biopotentials directly from the surface of the brain. To activate neurons SC was used stimulus on the nerves of the ipsilateral hindlimb.

***In experi**ments was found that after transection one of the ipsilateral dorsal root (DR) observe a reduction of the first negative and positive component of EP and the displacement of the point of maximum response to centre of dorsal surface. Simultaneously with this, the second component increases in amplitude (the local process disinhibition of neurons of second component). The additional deafferentation brain near the investigated segment leads to oppression all the components of EP and shifts the point of maximum response on the contralateral side.*

We conclude that a violation of the integrity of the dorsal roots after injury can be found depending on the amplitude of components of EP and the value of shift point of the maximum potential from the ipsilateral to contralateral part on the dorsal surface

Keywords: evoked potentials, amplitude, longitudinal distribution, deafferentation, dorsal root, spinal cord

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THE ANALYSIS OF MUTATION VARIABILITY OF WINTER WHEAT UNDER SOIL CONTAMINATION WITH HEAVY METALS OF INDUSTRIAL DISCHARGES

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The aim of the research was to study genetic consequences of soil contamination with heavy metals in the zones of industrial discharges according to frequency and spectrum of visible mutations of winter wheat.

Methods. *The identification and record of mutation frequency and spectrum of winter wheat were carried out in generations M_2 i M_3. All families of the plants with changed signs were carefully examined during major stages of their growth and development. The adequacy of the difference between averages of experimental variants and the control was estimated by the standard of Student and Fisher.*

Result. *Soil heavy metals of the industrial discharges of Burshtynska TPS, SC "Poltavchimmash", SPC "Specialized company for thermal processing of firm household garbage" in Kharkiv city, SJC "Luhansk accumulator producing company", UC "Lubny water supply station" and near B. Khmelnytskyi Street in Kostiantynivka caused the increase of visible mutation frequency of winter wheat varieties A'lbatros odes'kyi and Zymoiarka by 2.1–4.9 times. Mutation spectrum included several inherited changes which with high frequency were induced by soil contamination with heavy metals of the areas of all the studied objects: late ripening, high- and short-grown, long, dense, loose spike. Original and rare mutations were found among them: wide leaf, lack of wax film, yellow peak of a flag leaf, antocyanin spike husk, spike with twisted axis, light-green leaf.*

Conclusions. *Soil contamination with heavy metals of industrial discharges causes considerable increase of mutation variability of winter wheat, which can be a genetic threat to living organisms. Mutation spectrum includes typical inherited changes which together with original and rare mutations can be used as indicators of industrial contamination of the environment with heavy metals*

Keywords: *Triticum aestivum, mutation variability, heavy metals, mutations, mutagens, genetic consequences*

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