

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ  
ВИЩИЙ ДЕРЖАВНИЙ НАВЧАЛЬНИЙ ЗАКЛАД УКРАЇНИ  
«БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



## **МАТЕРІАЛИ**

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**СЕКЦІЯ 10**  
**ГІГІЕНА СЕРЕДОВИЩА І ВИВЧЕННЯ НОВИХ АНТИМІКРОБНИХ РЕЧОВИН**  
**В ЕКСПЕРИМЕНТІ І КЛІНІЦІ**

**Andriychuk N.J.**

**PECULIARITIES OF PATHOMORPHOLOGICAL CHANGES IN THE INTERNAL BODIES OF RATS AFTER SUBACUTE SILVER DECAHEDRON NANOPARTICLES POISONING**

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Silver nanoparticles (SNP) are becoming increasingly prevalent in consumer products. The increased use of SNP-enhanced products may lead to an increase in toxic levels of environmental silver, but regulatory control over the use or disposal of such products is lagging due to insufficient assessment of the toxicology of SNP and their rate of release into the environment. The question of the shape of nanoparticles is extremely relevant in nanoscience, nanotechnology and nanotoxicology. Silver nanoparticles are synthesized in different shapes: nanospheres, nanoprisms, nanotubes. The nanodecahedron is a poorly studied shape of nanosilver.

The aim of the research was to conduct a hygienic assessment of the *in vivo* subacute effect of the decahedron SNP obtained by the method of photostimulated synthesis.

Four groups of animals (8 rats in each group) were daily intraperitoneally administered with an SNP solution (10 mg/kg, 5 mg/kg, 1 mg/kg and 0.1 mg/kg concentration). Fifth group was under the biological control for 14 days. On the 14<sup>th</sup> day, the animals were removed from the experiment by decapitation under mild ether anesthesia.

Dose-dependent changes in the internal organs of animals of groups 1 and 2 were revealed in the result of the pathomorphological examination. Renal swelling of the sinusoidal tubules was observed in the kidneys; in the liver – reversible swelling of hepatocytes, intensive endothelial fusion with denudation of the surface of blood vessels in portal tracts and central veins; the alteration of the epithelium of the bronchi of different caliber in the form of dystrophy or necrosis was noted in the lungs, in the walls of the respiratory compartments – the anemia of the blood vessels was expressed; pronounced spasm of arterioles with the development of peri-arteriolar edema appeared in the brain.

The similar changes only from kidneys are markedly pronounced in rats' organs of the 3<sup>rd</sup> group. Morphological changes in the studied organs of animals of groups 4 and 5 were not detected.

So, according to the results of research: 1) silver nanodecahedrons have a pronounced toxic effect at doses 10 and 5 mg/kg; 2) the target organs for the decahedron SNP are kidneys, liver, heart, lungs and brain.

**Blinder O. O.**

**DYNAMICS OF THE PREVALENCE OF METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS IN PATIENTS WITH UPPER RESPIRATORY DISEASES**

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The prevalence of *Staphylococcus aureus* resistant to methicillin (MRSA) has increased in the world since their discovery in 1961. The morbidity and mortality from the infections they cause are also steadily increasing. According to the data of Ukrainian scientists, the isolation of MRSA is in the range of 30-60% of the total number of isolated *Staphylococcus aureus* strains

The aim of our study was to study the prevalence of MRSA among patients with upper respiratory tract pathology in Chernivtsi in 2018 and 2019.

248 clinical strains of *S. aureus* isolated from the patients with upper respiratory tract disease were investigated. The presence of methicillin resistance in isolated strains was determined



by a surrogate test with cefoxitin. In all strains, sensitivity to  $\beta$ -lactam antibiotics, aminoglycosides (gentamycin, amikacin), fluoroquinolones (ofloxacin, ciprofloxacin, levofloxacin), macrolides (erythromycin, clarithromycin, azithromycin), clindromycin and trithromycin, clindromycin, and trithromycin, and clitromycin were also determined. Technique for antibiotic sensitivity determination was conducted according to the CLSI recommendations, 2017. Discs with antibiotics, manufactured by Oxoid, were used.

Human upper respiratory tract mucous membrane in standard is normally colonized by various microorganisms, among which gram-positive cocci occupy a leading place. Therefore, the detection of a significant amount of *Staphylococcus aureus* from this biotope was expected. The results obtained are presented in table 69 strains of *Staphylococcus aureus* were isolated from the oral mucosa in 2018, and 149 strains - in 2019. The percentage of methicillin-resistant among them was 2.90 and 3.36, respectively. 10 and 20 strains of *Staphylococcus aureus* were isolated from the nasal mucosa, respectively (2018-2019). It is noteworthy that a significant proportion of the methicillin-resistant MRSA is 15% in the last year, while none of the 10 *S.aureus* strains isolated in 2018 were methicillin-resistant.

Table

Isolation frequency of *S. aureus* methicillin-resistant strains

	2018 year			2019 year		
	Number of isolated <i>S. aureus</i>	Number of MRSA	%	Number of isolated <i>S. aureus</i>	Number of MRSA	%
Oral mucosa	69	2	2,90	149	5	3,36
Nasal mucosa	10	0	0,00	20	3	15,00

When studying the antibiotic sensitivity of the isolated MRSA strains, it has been detected that resistance to antibiotics, which do not belong to  $\beta$  lactams occurs very often among them. The isolated strains were resistant to 3-7 antibiotics, which could belong to both one group and several groups. Compared to 2018 the percent of MRSA poly-resistant strains have almost doubled in 2019. The results obtained by the authors coincide with the data given by other scientists in their works. MRSA prevalence should be monitored continuously.

**Dzhuryak V.S.**

**ASSOCIATION OF ALDOSTERONE SYNTHASE CYP11B2 (-344C/T) GENE  
POLYMORPHISM OF CHRONIC KIDNEY DISEASE IN PATIENTS WITH ARTERIAL  
HYPERTENSION**

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Renin-angiotensin aldosterone system (RAAS) plays a major role in the blood pressure regulation. Aldosterone, synthesized in the adrenal cortex by aldosterone synthase is encoded by the cytochrome 11B2 aldosterone synthase gene (CYP11B2).

The aim of the study was to analyze the association of aldosterone synthase gene (CYP11B2) biallelic polymorphism in the promoter at position -344 (-344C/T) with Chronic Kidney Disease (CKD) in patients with essential arterial hypertension (EAH) in Bukovina region.

100 subjects with EAH and target-organ damaging (2<sup>nd</sup> stage), moderate, high or very high cardiovascular risk were involved in the case-control study. Among them 79.0% (79) females and 21.0% (21) males, mean age 59.87±8.02 years; disease duration from 6 to 25 years. Diabetes Mellitus type 2 (DM 2) was in 28 persons, duration from 3 to 15 years. CKD was determined by the National Kidney Foundation recommendations (Kidney Disease: Improving Global Outcomes (KDIGO), 2012)<sup>1</sup> after glomerular filtration rate (GFR) decline <60 ml/min/1,73m<sup>2</sup> for ≥3 months (by Cockcroft-Gault formula and CKD-EPI for Cystatin-C and Creatinine serum levels depending on gender). CKD was diagnosed in 29 persons. All enrolled / screened patients signed the Informed