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MATERIALS

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developed during polymerization reaction at freezing conditions. Pores appear due to the formation of ice crystals, which then melt at room temperature leaving behind an empty space. We decided to use a synthetic polymer to produce a wound dressing with longer shelf life. The idea is to impregnate the wound dressing with nanoparticles and enhance their antimicrobial activity by applying microwaves.

Methods. The toxicity of acrylamide was overcome by polymerization reaction between acrylamide polymers, acrylamide and N,N'-Methylenebisacrylamide. Preparation of silver nanoparticles of various sizes and geometries was previously described. The solution of nanoparticles was mixed with the solution of acrylamide and placed into cryobath at -20°C to allow formation of freezing and further polymerization of the solution and formation of ice crystals. After five hours, cryogels were taken out and placed in freezer at -20°C for 12 hours for incubation. The morphology of cryogel with incorporated nanoparticles was examined with scanning electron microscope.

Results. Acrylamide cryogel was successfully synthesized with incorporation of previously prepared silver nanoparticles. The cryogel had sponge-like texture, was elastic and white coloured. However, when dry it turned to a solid and rigid structure. Its initial form immediately was regained with rehydration. This property may be useful in packing and transfer of the dressing. This may also help to prolong the shelf life. Scanning of the matrix revealed successful attachment of nanoparticles to the pore walls of the cryogel.

Conclusion. Impregnation of cryogel with nanoparticles resulted in the attachment of silver nanoparticles to the pore walls of acrylamide cryogel. Cryogel acts as a moisturizing and protective layer. Cryogel demonstrated good mechanical properties such as elasticity and shape memory. Nanoparticles are open for the interaction with the wound environment since they are not covered with the polymer. Our next steps include assessment of antimicrobial properties and cytotoxicity of cryogel with nanoparticles, enhancement of the properties by microwaves in a controlled regimen.

GENOTOXIC ACTION OF UDMH ON GERM CELLS OF LABORATORY MICE

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Key words: genotoxicity, meiosis, synaptonemal complex, UDMH

Introduction. One of priority problems of environmental health is an assessment of mutagenic and cancerogenic properties of anthropogenous ecological factors (Sycheva, 2002). Researches on influence of environment pollutants on gametes are actively conducted (Tiwari, 2013; Souza, 2014; Attia, 2013). However data on influence of rocket fuel 1,1-dimethylhydrazine and its derivative UDMH on meiosis processes as one of factors of sterility and infertility, are practically absent. The knowledge of mechanisms of genotoxic action of xenobiotics on somatic cells and gametes of mammals will allow conducting purposeful search of protectants.

The aim of research is to study the genotoxic action of UDMH on germ cells of laboratory mice

Methods. In experiments 20 mice males of the BALB/c line at the age of 3 months were used. The UDMH water solution in a dose of 2,0 mg/kg was entered intraperitoneally once (acute

effect) and within 10 days daily (subacute exposure). The synaptonemal complex (SC) in stages of a pachytene and a diplotene of meiosis and total preparations of SC received by the modified Kolomiets O.L technique (2010) were considered.

Results. A single injection of UDMH to animals significantly increased the frequency of nuclei with damaged SC compared to controls from 13,07% to 78,07%. Fragmentation of SC (35.15%), nuclei with the autosomes and sex bivalent associations (33.10%) and with atypical structure of SC (75.46%) were observed. UDMH caused the disruption of the sex cells formation (5,08 %), annular SC (3,51%), desynapsis of sex chromosomes (7,08%). After a 10-day exposure of UDMH in mice the level of nuclei with damaged SC has increased compared with a single exposure and amounted to 87,95%. The frequency of the observed damage of the SC increased significantly, as well. In male mammals the violation of sinapsis of autosomes, impaired formation of «sexual bodies» because of the association of autosomal SC with sexual bivalent leads to a block in meiosis or pachytene arrest. Noted violations lead to increased errors in meiotic segregation of chromosomes, reducing the level of recombination and transcription. In humans, such violations lead to spontaneous abortion in early pregnancy or the birth of children with such diseases caused by aneuploidy as Down, Klinefelter, Edwards and Turner syndromes.

Conclusion. Thus, the assessment of genotoxic action of UDMH on the emerging gametes of mice males was carried out. Violations of structure the synaptonemal complexes of meiotic chromosomes, among which single and multiple fragments of SC, associations of autosomes with sexual bivalent, atypical structure of SC, premature desynapsis of sexual bivalents, impaired formation of the sexual cells and the annular SC were revealed.

GUT-SKIN METAGENOMICS: NOVEL UNDERSTANDING AND TREATMENT AVENUES

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Key words: gut-skin metagenome, skin microbiota, probiotic

Skin is the primary sensing organ for external stressors and the cutaneous sensory fibers also convey changes in temperature, pH, and inflammatory mediators to the central nervous system (CNS). The nerve terminals are then associated with receptors indicating close interaction. The brain responds to these signals, which in turn influence the stress responses in the skin. The skin also developed a fully functional peripheral HPA system where CRH, ACTH, and their receptors are produced in skin cells. Imbalanced interactions of commensal bacteria within the gut may lead to a chronic systemic, often subclinical, pro-inflammatory milieu predisposing to an array of adverse effects that feedback into a destructive inflammation-driven cycle. Dietary probiotic bacteria simultaneously stimulate the hypothalamus and pituitary gland to secrete health stimulating hormones, while also stimulating the regulatory arm of the immune system. Together, these two probiotic microbe-induced events, though not yet fully understood, interact to break the vicious pro-inflammatory cycle and boost good health-associated phenotypes in tissues distant from the gastrointestinal tract, such as the skin. Recent data show that antibiotic treatment decreases the bacterial density and alters the bacterial composition in skin wounds,