296. TOXICITY OF E-CIGARETTE CONSTITUENTS

Author: **Teodor Șișianu**
Scientific adviser: Olga Tagadiuc, MD, PhD, Associate Professor, Department of Biochemistry and Clinical Biochemistry, *Nicolae Testemitanu* State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

Introduction. Most e-cigarettes coils compounds are recognized safe, but those designations are for oral consumption and less to flavorings used in e-cigarettes. Most of these chemicals were never studied for toxicity via inhalation route and there are few studies confirming that heated substance maintains its primary chemical structure. Majority of articles state that nicotine is the main source of health injuries while using e-cigarettes, but there are few about other compounds and their impact on health.
Aim of the study. The aim of the study was to determine the toxicology of the e-cigarette constituents other than nicotine and its impact on human health.
Materials and methods. The bibliographic study was done, based on scientific articles published during 2016-2020 in journals from PubMed and Google Scholar databases, using the keywords "e-cigarette constituents", "propylene glycol", "e-cigarette flavors".
Results. E-cigarettes often contain ingredients such as propylene glycol and glycerol, mixed with concentrated flavors and, a variable percentage of nicotine. The most common compound of e-liquids is propylene glycol, which seems to be safe if administrated i/v or i/m in small concentrations as a vehicle for low water soluble medicines. Exposure to propylene glycol aerosols has been shown to cause irritation to the eyes and throat, while heated it may lead to formation of carbonyl compounds (formaldehyde and acetaldehyde), which are involved in irritation of respiratory tract, eyes and skin. Glycerol, another humectant, may lead to mild squamous metaplasia of airways, while the combusted glycerol leads to formation of acrolein that suppresses the Lipopolysaccharide-Induced Inflammatory Cytokine Production, causing COPD and asthma, as well as it and could impair vascular repair capacity. Diacetyl and acetylpropionyl, that is used to confer creamy flavor, may cause chronic cough, bronchitis, asthma, and obliterant bronchiolitis. The majority of coils have great amounts of metals (Pb, Ni, Cr, Cd, La, etc.) themselves, but also in e-cigarette construction, that are inhaled while smoking and lead to severe generalized health problems.
Conclusions. Public opinion towards e-cigarettes is duplicitous, being necessary scientific studies to establish their damaging actions or harmlessness. The latest research attests that many components of e-liquids are toxic by themselves; other could produce some toxic compounds when heated and aerosolized. Regardless of the origin of the harmful compounds – original in the e-cigarette or formed as a result of heat, they can produce chemical reactions that could injure the lungs, bronchi, eyes and skin.
Key words: toxicity, e-cigarettes, e-liquids, inhalation

297. NON-INVASIVE ASSESSMENT OF LIVER FIBROSIS IN AUTOIMMUNE HEPATITIS

Author: **Maria Trohin**
Scientific adviser: Olga Tagadiuc, MD, PhD, Associate Professor, Department of Biochemistry and Clinical Biochemistry, *Nicolae Testemitanu* State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

Introduction. The degree of liver fibrosis is of great importance for prognosis and therapeutic intervention in chronic liver diseases. However, there is a relative lack of tools and technologies for non-invasive and longitudinal assessment of liver fibrosis in autoimmune hepatitis (AIH). Low sensitivity and specificity of currently available diagnostic options highlight the necessity of fibrosis biomarker identification.
Aim of the study. To analyze the importance of non-invasive biomarkers for liver fibrosis assessment in AIH.
Materials and methods. A scientific review have been performed using HINARI database. Based on search terms "liver fibrosis", "non-invasive tests" and "biomarkers", articles on this topic have been identified and the most relevant ones have been studied.
Results. The extracellular matrix (ECM) may provide options for biomarker identification, as both the content and the composition of the ECM correlate with fibrosis stage. The balance between matrix metalloproteases (MMP) and tissue inhibitors of metalloproteases (TIMP) affects the turnover model of ECM, thus MMP-1, MMP-3, TIMP-1 are applied in non-invasive diagnosis as reliable fibrosis markers. The N-terminal propeptide of procollagen type III (PIIINP) reveals the intensity of ECM synthesis, but its specificity and sensitivity in fibrosis evaluation is considerable higher if associated with hyaluronic acid and MMP. Despite their high applicability and good reproducibility, biomarkers present some limitations in displaying liver fibrosis, because they are not liver specific and unable to discriminate between intermediate stages of fibrosis. On the other hand, transient elastography via liver stiffness measurement can stage hepatic fibrosis, especially with high performance for cirrhosis. However, the accuracy of this non-invasive technique in AIH is still limited due to false positive results in conditions like acute hepatitis, extrahepatic cholestasis, liver congestion, and lower applicability than serum biomarkers in case of ascites or/and obesity.
Conclusions. There is increasing evidence for the prognostic value of both functional and imaging biomarkers as liver fibrosis non-invasive assessment methods in AIH. Certainly, the combination of these different tools will overcome their individual disadvantages and allow a more personalized fibrosis staging.
Key words: liver fibrosis, biomarkers, transient elastography, autoimmune hepatitis.

298. BLOOD EXPRESSION OF OXIDATIVE STRESS

Author: **Cristina Tagadiuc**
Scientific adviser: Timercan Tatiana, PhD, University assistant, Department of Biochemistry and Clinical Biochemistry, *Nicolae Testemitanu* State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

Introduction. Oxidative stress is a pathogenic mechanism of a number of diseases that affect tissues and organs. The usefulness of the blood markers in the diagnosis of the diseases and/or conditions associated with oxidative stress is substantiated by the blood expression of oxidative stress and the correlation with the intensity of the pathological process in the organs. An indirect marker for oxidative stress is malonic dialdehyde (DAM), the end product of lipid peroxidation triggered by oxidative stress. The assessment of the DAM level could reveal the intensity of the processes and can determine the therapeutic strategy.
Aim of the study. To assess the level of DAM in the blood and the hepatic homogenate of laboratory animals in oxidative stress induced by muscle ischemia/reperfusion in crush syndrome.