13th INTERNATIONAL CONGRESS OF THE SERBIAN SOCIETY OF TOXICOLOGY

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1st TOXSEE REGIONAL CONFERENCE

Present and Future of toxicology: Challenges and opportunities

Удружење токсиколога Србије
Serbian Society of Toxicology

10 - 12 May, 2023 Belgrade

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ABSTRACT BOOK

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CONGRESS PROGRAM

VETERINARY EXPERIMENTAL TOXICOLOGY

NEUROTOKSIČNO DEJSTVO VENOMA *VIPERA AMMODYTES* NA MODELU IZOLOVANE DIJAFRAGME PACOVA

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Poskok (Vipera ammodytes) predstavlja najzastupljeniju zmiju otrovnicu u Srbiji i na Balkanu, kako po brojnosti tako i po arealu rasprostranjenosti. U poređenju sa venomima ostalih otrovnica iz familije Viperidae na Balkanu, toksičnost venoma poskoka je najveća. Neurotoksičnost sirovog venoma poskoka smo ispitivali u in vitro uslovima na osnovu kontrakcija preparata dijafragme izazvanih poljnom električnom stimulacijom i aktivnosti enzima: acetilholinesteraze (AChE) i ukupnih ATP-aza u dijafragmi.

Formirano je 5 grupa pacova (n=5): kontrola (dijafragma bez venoma), dijafragma sa venomom, dijafragma sa smešom venom/antivenom („Viekvin“, Torlak, Srbija) u odnosima 1:2, 1:10 i 1:20 (m/m). Kontrakcije dijafragme su opale na 50% kontrolnih kontrakcija: pod uticajem venoma za 62,00±2,31 minuta, a sa smešom venom/antivenom 1:2 za 78,50±7,51 minuta, 1:10 za 150,00±17,32 minuta, 1:20 za 307,50±2,89 minuta. Statistička razlika (p0,05) pod dejstvom venoma. Venom inhibira aktivnost ukupnih ATP-aza dijafragme za 51,81% u odnosu na kontrolu. Venom poskoka ne deluje na AChE i nikotinske receptore u neuro-mišićnoj sinapsi dijafragme, već narušava energetski metabolizam mitohondrija.

KLJUČNE REČI: Vipera ammodytes, neurotoksičnost, izolovana dijafragma, pacov

NEUROTOXIC EFFECT OF VIPERA AMMODYTES VENOM ON THE RAT ISOLATED DIAPHRAGM MODEL

VETERINARY EXPERIMENTAL TOXICOLOGY

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Vipera ammodytes is the most common venomous snake in Serbia and the Balkans, both in terms of numbers and area of distribution. Compared to the venoms of other poisonous snakes from the family Viperidae in the Balkans, the toxicity of the V. ammodytes venom is the highest. We investigated the neurotoxicity of crude venom in vitro using contractions of the diaphragm preparation induced by electric field stimulation and enzyme activity: acetylcholinesterase (AChE) and total ATPases in the diaphragm. Five groups of rats were formed (n=5): control (diaphragm without venom), diaphragm with venom, diaphragm with mixture of venom/antivenom ("Viekvin", Torlak, Serbia) in the ratio 1:2, 1:10 and 1:20 (m/m).

Diaphragmatic contractions decreased to 50% of control contractions: under the influence of venom for 62.00±2.31 minutes, and with venom/antivenom mixture 1:2 for 78.50±7.51 minutes, 1:10 for 150.00±17.32 minutes, 1:20 for 307.50±2.89 minutes. A statistical difference (p 0.05) under the influence of the venom. Venom inhibits the total ATPases activity of the diaphragm by 51.81% compared with control. The venom of V. ammodytes does not act on AChE and nicotinic receptors in the neuromuscular synapse of the diaphragm, but interferes with mitochondrial energy metabolism.

KEYWORDS: Vipera ammodytes, neurotoxicity, isolated diaphragm, rats

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