



Bulgarian Society of Physiological Sciences Sofia branch

SCIENTIFIC MEETING ABSTRACTS

Sofia, 19 February, 2016





BULGARIAN SOCIETY OF PHYSIOLOGICAL SCIENCES SOFIA BRANCH

SCIENTIFIC MEETING

ABSTRACTS

03 November, 2017, Sofia, Bulgaria

LOCAL ORGANIZING COMMITTEE

Assoc. Prof. Elena Dzhambazova, PhD

Assist. Prof. Milena Mihailova, PhD

Assist. Prof. Rene Mileva

Assist. Prof. Polina Mateeva, PhD

Assist. Prof. Boris Kadinov, PhD

Programme Overview

Oral presentations

14.00 - 14.15	Welcome to the meeting
14.15 - 14.30	Daniel Ivanov, Eleonora Dencheva, Palmena Angelova, Mihail Tsonev,
	Todor Dimitrov
	Music and its effects on the human body
14.30 – 14.4 <mark>5</mark>	Daniela Pechlivanova, Milena Nikolova, Strachil Berkov, Alexander
	Stoynev
	Effects of mesembrine fraction from <i>Narcissus cv. "Hawera"</i> on
	anxiety and depression-like behavior in mice
14.45 – 15. <mark>00</mark>	Peter Paychev
	Palpatory and auscultatory method for measurement of arterial
	blood pressure or methods of Riva Rocci and Riva Rocci
15.00 - 15.15	An <mark>astas</mark> ios Papageorgiou, Lubomir Traikov, Elena Dzambazova, Radka Hadjiolova, Juliq Petrova
	Synergetic action of selective cyclooxygenase inhibitor and
	nicardipine on oxidative stress markers at 6-OHDA rats
15.15 - 15.30	Tsveta Stoyanova, Elena Dzhambazova, Daniela Pechlivanova, Jana
	Tchekalarova
	Anticonvulsant activity of cannabinoid receptor 2 agonist β -
	caryophyllene on seizure tests in ICR mice

MUSIC AND ITS EFFECTS ON THE HUMAN BODY

Daniel Ivanov, Eleonora Dencheva, Palmena Angelova, Mihail Tsonev, Todor Dimitrov

Sofia University, Medical Faculty, Kozyak 1 STr. e-mail: elisis97@gmail.com

Music is known to be a powerful emotional trigger and thus can have a major impact on mood. On these grounds, it has been used in medical procedures and therapy schemes as a non-invasive palliative method to alleviate pain, reduce anxiety and possibly depression. Studies suggest this is possible by modulating physiological variables that are in direct association with activity in the cerebral cortex and more ancient brain structures. As far as pain and anxiety management is concerned, the literature says music can have a profound effect on emotional states that alter and adapt bodily functions. Nevertheless, the conditions required to achieve these results are still vague due to inconsistencies among studies deriving from the different approaches and methodologies. Conversely, findings provide empirical evidence that heart rate (HR), heart rate variability (HRV), respiratory rate (RR) and to some point blood pressure (BP) show signs of modulation when listening to music. Studies provide information that listening to music, particularly to exciting one, provokes higher heart and respiratory rates. Listening to unpleasant or calming music also gave similar results but to a lesser extent. In contrast, HRV tends to be lower during exciting and higher during calming music. In sum, despite these palpable effects on the human body, the lack of sufficient data and moreover the inconsistencies between studies call for more and controlled research in the field to identify the biological pathways involved and to further assess the utility of music in the clinical setting.

EFFECTS OF MESEMBRINE FRACTION FROM NARCISSUS CV. "HAWERA" ON ANXIETY AND DEPRESSION-LIKE BEHAVIOR IN MICE

Daniela Pechlivanova¹, Milena Nikolova², Strachil Berkov², Alexander Stoynev³

¹Institute of Neurobiology, BAS ²Institute of Biodiversity and Ecosystem Research, BAS ²Medical University of Sofia

Mesembrine type alkaloids have a long history of traditional use, but recently the attention of scientists was concentrated on their possible use as a tool to maintain and improve a sense of well-being in healthy people, and for the treatment of people with advanced symptoms of anxiety, stress and major depression disorder. These type alkaloids are found in high concentrations in species of the genus *Sceletium*, some species of the genus *Narcissus* (*Amaryllidacae*) and cultivated *Narcissus cv. "Hawera"*. Literature data show that mesembrine alkaloids exerted an activity as inhibitors of transport for the serotonin reuptake and the enzyme that breaks down cAMP in brain tissue. We built a hypothesis that the enrich mesembrine fraction from *Narcissus cv. "Hawera"* (MZM) will exhibit anxiolytic and antidepressant effects.

Two classical tests for estimation of the anxiolytic (elevated plus maze test) and antidepressant effects (tail suspension test) were used to prove this hypothesis. Experiments were performed on young adult male and female ICR mice. MZM was injected intraperitoneally at doses of 50, 25 and 12.5 mg/kg of body weight, 30 minutes before the behavioral tests.

The results showed that MZM in doses of 25 and 50 mg/kg induced a significant increase in motor activity in male mice. The dose of 50 mg/kg induced an anxiolytic-like behavior only in male mice. Data from "Tail suspension" test showed that MZM at a dose of 50 mg/kg induced an antidepressant effect in male mice and the doses of 25 and 50 mg/kg produced a similar effect in female mice. This preliminary data showed that MZM alkaloids possessed some gender-dependent stimulatory, anxiolytic and antidepressant effects. Further studies are necessary to estimate the mechanisms of these effects.

Acknowledgements: This work was supported by the Medical Science Council, Medical University, Sofia, Bulgaria, contract № D-71/2017.

ПАЛПАТОРНИЯТ И АУСКУЛТАТОРНИЯТ МЕТОД ЗА ОПРЕДЕЛЯНЕ НА АРТЕРИАЛНОТО КРЪВНО НАЛЯГАНЕ ИЛИ МЕТОДИТЕ НА РИВА-РОЧИ И... РИВА-РОЧИ

Петър Райчев

Медицински факултет, Софийски Университет "Св. Климент Охридски"

Най-широко застъпените неинвазивни методи за измерване на артериалното кръвно налягане като палпаторният метод (метод на Рива-Рочи) и аускултаторният метод на Коротков са съществен елемент от обучението на студентите в курса по физиология на човека. Въпреки съществените принципни различия между двата метода и историческите факти, свързани с тяхната разработка и въвеждане, наложилата се традиция свързва и двата метода с името на Рива-Рочи. Често аускултаторният метод, въпреки споменаването на тоновете на Коротков, се представя като модификация на палпаторния метод, а получените данни се реферират като измерване по Рива-Рочи (RR). Така създалата се ситуация е често объркваща за студентите по медицина, тъй като те се затрудняват да разграничат тези методи и не разбират кой изобретател кой от тях е разработил. Задача на преподавателите по физиология е да не допуснат объркване в знанията на студентите по отношение на тези широко приложими и актуални методи за измерване на артериалното кръвно налягане. За ясното характеризиране и последващо разграничаване на двата метода би трябвало (съгласно историческите факти) те да се наименоват според изобретателите, които са ги разработили – палпаторният да се обозначава като метод на Рива-Рочи, а аускултаторният като метод на Коротков.

Ключови думи: кръвно налягане, Рива-Рочи метод, физиология, обучение

SYNERGETIC ACTION OF SELECTIVE CYCLOOXYGENASE INHIBITOR AND NICARDIPINE ON OXIDATIVE STRESS MARKERS AT 6-OHDA RATS

Anastasios Papageorgiou^{1*}, Lubomir Traikov¹, Elena Dzambazova², Radka Hadjiolova³, Julia Petrova⁴

¹Department of Medical Physics and Biophysics; Faculty of Medicine; Medical University-Sofia ²Department of Physiology and Pathophysiology; Faculty of Medicine; Sofia University ³Department of Pathophysiology; Faculty of Medicine; Medical University-Sofia ⁴Department of Neurology; Faculty of Medicine; Medical University-Sofia

Reactive oxygen species (ROS) produced by oxidative stress (OS) can cause cellular damage and subsequent cell death. Therefore OS has been implicated in the pathophysiology of many neurological, particularly neurodegenerative diseases. Literature data reveal correlation between OS and the deficiency of most potent antioxidant enzymes such as like superoxide dismutase, glutathione (GSH) concentration, glutathione peroxidase, glutathione reductase, and catalase.

The aim of present study was to investigate the effects of the newly synthesized selective cyclooxygenase (COX) inhibitor and L-type calcium channel inhibitor nicardipine in the prevention of motor impairments and observed antioxidant effects in rats with *6-hydroxydopamine* (6-OHDA) model of *Parkinson's disease*.

Behavior and biochemical tests were used to evaluate the effectiveness of the 20 days treatment with COX inhibitor and nicardipine. Our results showed that combination of COX (50 mg/kg, i.p.) and nicardipine (30 mg/kg, i.p.) increased significantly brain dopamine level (p < 0.001), improved the motor activity and also ameliorated the amount of GSH and decreased lipid peroxidation rate.

These results strongly suggest that synergetic action of both drugs used has better neuroprotective effect in comparison to single medicine treatment on motor, biochemical or antioxidant parameters in early phase of Parkinson's disease.

Key words: COX inhibitor, nicardipine, motor impairment, antioxidants, 6-OHDA model of Parkinson's disease.

ANTICONVULSANT ACTIVITY OF CANNABINOID RECEPTOR 2 AGONIST β-CARYOPHYLLENE ON SEIZURE TESTS IN ICR MICE

Tsveta Stoyanova¹, Elena Dzhambazova², Daniela Pechlivanova^{1,2}, Jana Tchekalarova¹

¹Institute of Neurobiology, Bulgarian Academy of Sciences, Sofia, Bulgaria ²Medical Faculty, Sofia University "St. Kliment Ohridski", Sofia, Bulgaria

Literature data suggests that endocannabinoid system is involved in brain excitability and seizure sucseptibility in particlar. The aim of this work was to ascertain the role of cannabinoid receptor type 2 (CB₂) on seizure susceptibility in ICR mice. For the purpose, the effect of a natural bicyclic sesquiterpene, which is a selective CB₂ receptor agonist β caryophyllene (BCF), was tested in a battery of seizure models with different mechanism of action in ICR mice.

Dose-dependent effect of BCF (acute i.p. injection at doses of 30, 100, and 300 mg/kg, respectively) on maximal electroshock (MES) and subcutaneous pentylenetetrazol (scPTZ) tests was explored. Chronic injection of BCF (50 and 100 mg/kg for 14 days) was applied before kainic acid (KA) to study the effect of this drug on status epilepticus (SE). Three hours after SE mice were decapitated and the hippocampus was isolated for analysis of anti-antioxidative effect of BCF. Acute neurotoxicity was determined via the test for minimal motor impairment (rota-rod). No signs of acute toxicity were observed in all doses uses.

BCF exerted anticonvulsant effect in MES tests and prevented tonic-clonic seizures at a dose of 30 mg.kg⁻¹ which effect was comparable to that of the referent drug phenytoin. However, BCF failed to suppress clonic seizures in the scPTZ test in the three doses used suggesting that the compound is unable to to raise the seizure threshold. Chronic exposure to CB_2 receptors alleviated SE at a dose-dependent manner. BCF treatment decreased significantly lipid peroxidation in KA-treated rats compared to controls, which was tested through measurement of malondialdehyde concentration in the hippocampus.

The results suggests activation of CB_2 receptors produce anticonvulsant activity and prevent seizure propagation. Moreover, it allviates SE through suppression of lipid peroxidation in the hippocampus. Therefore, BCF deserves further exploration in models of epilepsy and psychiatric comorbities.

Key words: β -caryophyllene, seizure susceptibility, status epilepticus, oxidative stress, mice

Acknowledgements: This work was supported by Grant 80-10-104/2017 from the Scientific Research Fund of Sofia University "St. Kliment Ohridski".

Author Index

Angelova, P., 4 Berkov, S., 5 Dencheva, E., 4 Dimitrov, T., 4 Dzhambazova, E., 7, 8 Hadjiolova, R., 7 Ivanov, D., 4 Nikolova, M., 5 Papageorgiou, A., 7 Pechlivanova, D., 5, 8 Petrova, J., 7 Raychev, P., 6 Stoyanova, Ts., 8 Stoynev, A. 5 Tchekalarova, J., 8 Traikov, L., 7 Tsonev, M., 4