

Aim: To characterize behavioural and cardiorespiratory changes in a new, intermittent low-level lead exposure animal model.

Introduction: Lead (Pb) is a cumulative toxic metal affecting all body systems that are particularly vulnerable during developmental phase. Permanent lead exposure has been defined as a cause of behavioural changes, cognitive impairment, sympathoexcitation, tachycardia, hypertension and autonomic dysfunction. However, no studies have been performed to describe a new, intermittent low-level lead exposure profile, that has been increased in the past years.

Methods: Foetuses were intermittently (PbI) exposed to water containing lead acetate (0.2%, w/v) throughout life until adulthood (28 weeks of age). A control group (without exposure, CTL), matching in age and sex was used. At 26 weeks, behavioural tests were performed for anxiety (Elevated Plus Maze Test) and locomotor activity (Open Field Test) assessment. Blood pressure (BP), electrocardiogram (ECG), heart rate (HR) and respiratory frequency (RF) rates were recorded at 28 weeks of age. Baroreflex gain (BRG) and chemoreflex sensitivity (ChS) were calculated. Student's *T*-test was used (significance $p < 0.05$) for statistical analysis.

Results: An intermittent lead exposure causes hypertension (increased diastolic and mean BP), increased RF, decreased baroreflex function and increased ChS, without significant changes in HR, when compared to CTL group. Regarding behavioral changes, the intermittent lead exposure model showed an anxiety-like behaviour without changes in locomotor activity.

Conclusion: Intermittent low-level lead exposure induces changes on the cardiorespiratory profile characterized by hypertension, carotid chemosensitivity and baroreflex impairment. According to behavioural tests results, this study also shows that the exposure to lead during developmental phases causes anxiety in adult animals without locomotor activity impairment.

In summary, this study brings new insights on the environmental factors that influence nervous and cardiovascular systems during development, which can help creating public policy strategies to prevent and control the adverse effects of Pb toxicity.

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PS120

Antihypertensive effects of two novel dihydropyridine derivatives

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Aim: Treatment of hypertension.

Introduction: Mebudipine and dibudipine are two novel derivations of dihydropyridine (DHP) Ca²⁺ channel blockers. Previous studies have shown that these two compounds have relaxant effects on vascular smooth muscles. In addition, DHPs are able to reduce contraction force of cardiac muscle in rat. In this study we decided to evaluate the antihypertensive effects of these two novel DHPs in hypertensive rat.

Methods: Male Sprague-Dawley rats were used in the study (8–10 weeks old). The rats were randomly divided to 4 groups of 10 rats (one control and 3 test groups). Blood pressure was measured by Tail cuff method. Left kidneys of the rats were removed by nephrectomy and sodium chloride 1% was added to the drinking water of animals and desoxycorticosterone acetate 20 mg/kg (SC) were injected twice a week. During and after 4 weeks, blood pressure of animals was evaluated to confirm the hypertension. Blood pressure of the animals was measured before i.p. injection of mebudipine and dibudipine (1–8 µmole/kg) and 2 min after the drug administration.

Results: Mebudipine and dibudipine significantly reduced the systolic blood pressure. Mebudipine was more effective than dibudipine and nifedipine in hypertensive animals and has significant results.

Conclusion: Previous studies showed that i.p. injection and oral usage of mebudipine and dibudipine decrease systolic hypertension in normotensive animals, on the other hand vasodilation effects of DHPs have been proved on aorta. Both novel drugs showed significant reduction in systolic blood pressure in hypertensive animals and mebudipine was more potent than dibudipine and nifedipine (as a standard drug uses). It is remarkable that, two new DHPs have similar efficacy and safety profile, but have higher efficacy compared to nifedipine in present study. The brilliant point is that DHPs as calcium channel blockers are more effective in hypertensive animals compared to normotensive animals.

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PS062

Biological processes of polyphenols in the cardiovascular system: A bioinformatics approach

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Aim: In this study, we aimed to evaluate the cardiovascular system-related biological processes (BP) modulated by polyphenols in rodents and humans, and to verify which of them are specie-

^a Augusto Rachão and Ana Filipa Silva contributed equally to this work.



specific, in order to understand which outcomes for cardiovascular diseases (CVD) could be translated from animal to human studies.

Introduction: CVD stand as a great cause of morbi-mortality worldwide and polyphenol-rich diets have been associated with improved cardiovascular risk profiles. Although rodent models have been a resourceful means of understanding the CVD mechanisms and possible outcomes of the use of polyphenols in that context, most experimental models do not fully reproduce human CVD.

Methods: Database searching was carried out on PubMed and Google Scholar using specific keywords concerning CVD, retrieving close to 300 publications. After excluding irrelevant results, proteome data was organized in Excel[®] spreadsheets and the Cytoscape platform, ClueGo + CluePedia and Venny 2.1.0 were used to explore the biological processes influenced by flavonoids in the approached CVD.

Results: This study was mainly focused in the species *Rattus norvegicus* and *Homo sapiens* and in flavonoids, a polyphenol subgroup. Only about 5% of the BP influenced by flavonoids were common to both species and they were mostly related to the maintenance of blood pressure and the fatty acid metabolic process. Nevertheless, these effects were accomplished through different proteins/pathways and different subgroups of flavonoids.

Conclusion: Our research highlights the need for a careful translation of the flavonoids' effects observed in rat models to clinical trials, since different proteins and subgroups of flavonoids mediated the observed actions. Though this type of studies can provide insights to help choosing the most adequate polyphenols as preventive approaches or therapies for human CVD, further investigation should be performed to clarify the described effects. Besides, pharmacokinetic aspects of the flavonoids' action should also be considered when planning clinical trials.

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PS167

Affinity of *Listeria sp.* proteins to cAMP and role in virulence

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Aim: The aim of this study was thus to identify Lm proteins capable to bind cAMP.

Introduction: Infectious diseases are still a major cause of death worldwide. To infect a host and survive the environment, bacteria have to sense their surrounding and adjust their behaviour. In this adaptation process, cAMP (cyclic adenosine monophosphate) is known to be an important player in pathogens such as *Pseudomonas spp.*, *Vibrio spp.* or *Mycobacterium spp.* The small molecule

cAMP is a cyclic nucleotide that relays information from receptors to one or more effector proteins within a bacterial cell, functioning as a second messenger. To mediate a response, cAMP allosterically interacts with cAMP-binding proteins. Understanding how this happens is fundamental to predict how bacteria will adapt/act to/in a given context.

Methods: We recently showed that the human foodborne pathogen *Listeria monocytogenes* (Lm) produces cAMP. The aim of this study was thus to identify Lm proteins capable to bind cAMP. To do this, four candidate proteins selected by bioinformatics analyses were expressed, purified and studied biochemically. Three approaches were used: cAMP affinity chromatography; competitive cAMP affinity chromatography; and isothermal titration calorimetry (ITC).

Results: Among the four tested proteins, CbpA displayed cAMP-binding ability on the three approaches used.

Conclusion: Hence, our preliminary results showed that CbpA binds to cAMP. It is now mandatory to understand the relation between cAMP and CbpA, to determine the function of the protein itself and in complex with cAMP, and to understand the importance of this signalling system for virulence.

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PS044

Assessment of ECG interpretation skills among Polish medical students, nursing, emergency medicine and English Division medical students



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Aim: The aim of the study was to evaluate ECG interpretation skills among study population, and analyze factors determining their score.

Introduction: The electrocardiogram examination is one of the most frequently performed diagnostic test. Correct interpretation of the ECG, particularly in life-threatening scenarios (LTS) may influence the decisions on appropriate actions and consequently have an impact on the lives and health of patients. It is important for medical, nursing and emergency medicine students to acquire this skill.

Methods: ECG interpretation skills were assessed by self-prepared questionnaire including questions about demographic data and 20 ECG problems with 17 cases. In 6 cases there were LTS. Three questions evaluated basic knowledge about rhythm, heart rate and axis. The survey was conducted via Internet. Study population consist of 551 medical, nursing and emergency medicine students.

Results: The overall score among Polish medical students is 46% which is higher than nursing and emergency medicine students (22% and 37% respectively; $p < 0.001$ in both). English division students scored almost similarly (49%; $p = 0.27$). Polish medical students scored better in LTS than the nursing students (37% vs 23%; $p < 0.001$). Among Polish medical students: Students in year “4–6” scored higher than those from year “1–3” (overall score: 51% vs. 31%; $p < 0.001$, LTS: 41% vs 25%; $p < 0.001$). In addition, members

