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SPATIAL MEMORY DEFICITS AND OXIDATIVE STRESS DAMAGE FOLLOWING EXPOSURE TO LIPOPOLYSACCHARIDE IN A RODENT MODEL OF PARKINSON’S DISEASE

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A number of deleterious effects on behavior and cognition in laboratory animals have been observed following immune system activation with lipopolysaccharide. The purpose of the present study is to provide additional support for memory processes vulnerabilities and stress reactivity in a 6-OHDA-lesion model of Parkinson’s disease associated with bacterial endotoxin infection. Also, we searched for a possible correlation between behavioral responses and oxidative stress. In the present study, male Wistar rats received saline, lipopolysaccharide (LPS, 250 microg/kg in saline, 7 consecutive days), intranigral 6-hydroxydopamine (6-OHDA, 2microg/microliter saline; 5microl/site) and intranigral 6-OHDA plus 7 consecutive days of LPS injections and then tested in two cognitive tasks (Y-maze and radial arm-maze). Altered behavioral responses in Y-maze and radial arm-maze tasks were observed in LPS- and LPS+6-OHDA-treated rats compared to control group. Notably, positive correlations were detected among LPS and LPS+6-OHDA-treated rats when behavioral deficits were correlated with indicators of oxidative stress. Taken together, we demonstrated that activation of the immune system with LPS administration induced memory impairment and brain oxidative stress, significantly correlated with nigral lesion promoted by 6-OHDA.

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6-HYDROXY-L-NICOTINE FROM ARTHROBACTER NICOTINOVORANS SUSTAIN SPATIAL MEMORY FORMATION BY DECREASING BRAIN OXIDATIVE STRESS IN RATS

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Male Wistar rats were subjected to chronic 6-hydroxy-L-nicotine treatment (6HLN, 0.3 mg/kg, i.p.; 7 consecutive days) and their memory performance was studied by means of Y-maze and radial arm-maze tasks. 6HLN significantly increased spontaneous alternations in Y-maze task and working memory in radial arm-maze task, suggesting effects on short-term memory, without affecting long-term memory, explored by reference memory in radial arm-maze task. In addition, 6HLN increased antioxidant enzymes activity and decreased production of lipid peroxidation, suggesting antioxidant effects. Also, the
linear regression between behavioral measures and oxidative stress markers resulted in significant correlations. Therefore, positive effects of 6HLN on spatial memory may occur by antioxidant actions.

EXPERIMENTAL EVIDENCE OF A XYLOSE-CATABOLIC PATHWAY ON THE PAO1 MEGAPLASMID OF ARTHROBACTER NICOTINOVORANS

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Based on similarity searches, two putative pathways were previously described as being encoded by the pAO1 megaplasmid of Arthrobacter nicotinovorans: an almost fully established nicotine-degrading pathway and a yet unknown putative sugar-catabolic pathway. The general organization of the latter indicated the presence of a transcriptional control factor, an multicomponent ABC-type sugar transport system and a cascade of dehydrogenases and oxidoreductases. The current work is focused on experimental identification of the catabolic pathway substrate. An initial screening was performed using the A. nicotinovorans pAO1 WT strain and a cured derivative strain (pAO1'). Igloi and Brandsch, 2003) not harboring the pAO1 plasmid. As the megaplasmid is not present in the cell, the latter strain is unable to form nicotine-blue and also, as shown here, is unable to degrade five sugars and derivatives (D-Ribose, D-Xylose, L-Rhamnose, D-Sorbitol, GlcNAc) out of 50 carbohydrates tested using an API50CH kit.

Part of this yet unknown sugar catabolic pathway is orf40, a putative dehydrogenase containing the partially conserved consensus sequence: 119-AGKHIIFTEKPK-128, similar to AGKHVxCEKPK motif found in sugar-dehydrogenases. The gene was cloned, the protein expressed and purified as an 45 kDa slightly brown Histagged protein and used to raise antibodies in rat. Western-Blotts using anti-ORF40 as primary antibodies were further used in a series of experiments aimed at establishing the expression conditions of the ORF40 protein in A. nicotinovorans pAO1 WT.

Although our previous in-silico blind docking experiments indicated tagatose as the putative ligand for several proteins in the pathway (Mihasan, 2010), the current work showed that tagatose is degraded by both the pAO1+ and pAO1- strains. Nevertheless, the docking scores always placed xylose among the top five ligands, indicating that that the second pathway coded by the pAO1 megaplasmid is a xylose catabolic pathway.

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CLONING AND PURIFICATION OF A REPRESSOR PROTEIN FROM ARTHROBACTER NICOTINOVORANS PAO1

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The pAO1 megaplasmid of A. nicotinovorans consists of 165 ORF's related mainly to nicotine degradation, uptake and utilization of carbohydrates, amino acids and sarcosine. The putative sugar catabolic pathway consists of 11 ORF's organized as a single operon and coding for an ABC-type sugar-transport system and several putative oxidoreductases and dehydrogenases. The current work is focused on orf32, a putative PdhR related protein, most probably involved in the control of the whole operon.
Directional gene cloning using degenerated primers as well as protein expression and protein purification by IMAC were performed according to standard methods. Gel permeation chromatography (GPC) was performed on a 16/20 Sephadex 200 pg (Amersham Biosciences) column attached to Pharmacia LKB FPLC system. The column was first calibrated using blue dextran, aldolase (158 kDa), ovalbumine (47 kDa), and chymotripsinogen (25 kDa). The approx. 700 kb orf32 gene was cloned in the pH6EX3 plasmid vector and the gene product purified to homogeneity as a 29 kDa His-tagged recombinant protein. As indicated by GPC, it consists of a monomeric protein with a native molecular weight of 32 kDa. The specific UV/Vis spectra showed only a single peak at 280 nm common for all proteins and did not indicated the presence of any colored cofactors. This is in good agreement with the fact that PdhR-family proteins contain a winged helix-turn-helix (WHH) domain responsible for DNA binding, and not a Zn-finger or any other metal containing domains.

Conclusions. The orf32 gene of Arthrobacter nicotinovorans pAO1 encodes a monomeric 32 kDa protein containing no metal ions. Due to its position and orientation, it is most probable the repressor protein for the whole putative carbohydrate catabolic operon.

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THE INCIDENCE OF IRON-DEFICIENCY ANEMIA ON THE BOTOSANI CITY POPULATION

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Iron-deficiency anemia is a major public health problem, encountered both in the emergent and developed countries, with significant consequences for health. We used data pertaining to the patients discharged from the “Mavromati” Emergency Hospital of Botosani between 01.01.2005 and 31.12.2010 (814 cases). Regardless of the year analyzed, the greatest weight of anemia cases is recorded amongst old people, over 55 years; in the second category (25-55 years) the number of anemia cases is reduced almost by half and there is a very low weight among young people (0-25 years).

ANTIBACTERIAL EFFECT OF CELLULOSE ACETATE PHthalATE NANOparticles ON STAPHYLOCOCCUS AUREUS

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The testing of the antibacterial action of the nanoparticles based on cellulose acetate phthalate is one of the current concerns of the researches in the field, taking into consideration their biomedical applications. The purpose of this study was to highlight the antibacterial effect of nanoparticles obtained by electrospinning using a 10% solution of cellulose acetate phthalate (CAP) in 2-methoxyethanol, respectively in an 85:15 (v/v) mixture of 2-methoxyethanol-water and polymer-embedded silver nanoparticles. The electrospinning of cellulose acetate phthalate resulted in fine particles or fibers, depending on the solvent and the polymer solution concentration. At concentrations of 12.5% w/v, uniform fibers with small diameters (below 500 nm) were obtained, while at concentrations of 25% w/v, fine fibers of approximately 600 nm diameter formed. The SEM analysis revealed the interesting morphology of such nanoparticles as hollow hemispheres generated