

Electrical Stimuli Shape Parametres Optimization in Electroanalgesia

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The transcranial electrostimulation (TES) is a procedure based on the effect induced by electrical current when passing through the brain, through electrodes placed in the scalp. Several attempts were made to produce and maintain a state of general anesthesia, over more than 70 years, by administering different parameters of electrical currents, applied to the skin of the subject's head (i.e., transcranially and transcutaneously). However, due to the high intensity of current required to induce general anesthesia, these efforts were abandoned and superseded by attempts to produce analgesia, rather than general anesthesia, by application of electrical currents. The experiments were conducted on two lots of ten rats each (Wistar, males, 150-200 g each), all under general anesthesia, using Tiopental 50mg/kg. The carotid artery was catheterized and the catheter connected to a pressure measuring device, for the observation of the blood pressure deviations. The blood pressure was measured before TES, after pain stimulation, and after TES and painful stimulation. A rise in the blood pressure parameters would indicate an intense pain sensation. That is explained by the fact that at pain stimulation a "fight or run" reflex occurs, that is mainly accomplished by the sympathetic nervous system. The data obtained revealed a tendency of normalization in the blood pressure registered after pain stimulation when using rectangle shaped current. The parameters registered while using the triangle shaped current showed no notable changes before and after TES. The results indicate to the analgesic effect that can be obtained by TES with rectangle shaped currents. The triangle shaped currents showed no notable analgesic effect upon usage.

Features of Changes in Oxidant/Antioxidant System of Alveolar Macrophages Exposed to Cigarette Smoke

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Oxidants and reactive oxygen species (ROS), contained in cigarette smoke (CD), can initiate oxidative stress, which results from oxidant/antioxidant imbalance. The aim of this study was to investigate the influence of cigarette smoke extract (CSE) on ROS production, lipid peroxidation (LPO) level and antioxidant enzymes activity in alveolar macrophages (AM) depending on the tar concentration in CSE and the duration of its affection. AM were isolated from bronchoalveolar lavage fluid of rats and incubated for 1 h and 24 h in a medium with the addition of varying concentrations of CSE – 0,7 g/L, 1,4 g/L and 2,1 g/L. The activity of free radical processes was evaluated on the basis of the determination of hydrogen peroxide (H₂O₂) concentration and also the concentration of LPO products reacting with thiobarbituric acid (TBA). The status of the enzymatic antioxidant system of AM was assessed by the level of superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) activities. H₂O₂ concentration, TBA-active LPO products level and also SOD, CAT and GPx enzyme activities were determined spectrophotometrically. It is found out that with the joint incubation of AM and CSE for 1 h the increase in H₂O₂ concentration in cells and in incubation medium occurs due to the increase in its production in AM 2 times, while during incubation for 24 h - 3,4 times. Another reason for the increasing in H₂O₂ concentration in AM is the reduction of the activity of the enzymes (CAT and GPx), which carry out the process of H₂O₂ decomposition. SOD activity in AM decreases already after the incubation for 1 h in a medium enriched by tar of a tobacco