Effect of nicotine on the structure of cochlea of guinea pigs

Amel M. M. Abdel-Hafez, Sanaa A. M. Elgayar, Ola A. Husain

Abstract:

Smoking has been positively associated with hearing loss in human. However, its effect on the cochlea has not been previously evaluated. Aim of work is to investigate the effect of nicotine, which is the primary pharmacological component of tobacco, on the structure of the cochlea of adult male guinea pigs. Fifteen male guinea pigs were classified into two groups: group I (control) and group II (nicotine treated group). Group II was further subdivided into two subgroups; IIA and IIB according to the dose of nicotine (3 mg/kg and 6 mg/kg, respectively). The cochlea was harvested and processed for light microscopy, transmission electron microscopy and scanning electron microscopy. Nicotine administration induced damage of outer hair cells which were distorted in shape with vacuolated cytoplasm and heterochromatic nuclei. Topography revealed damage of the stereocilia which included disorganization, bent and limp or complete loss and expansion of the surrounding supporting cells. These changes were more pronounced in the basal turn of the cochlea and mainly involved the outer hair cells. High dose induced more damage and resulted in protrusion of the apical poles of hair cells (blebing), particularly the outer two rows. Nicotine is proved to be harmful to the cells of the cochlea, particularly the outer hair cells of the basal turn. High doses induce blebing of hair cells.

Keywords:

Nicotine, Cochlea, Guinea pigs, Scanning electron microscopy

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