Effects of Different Routes of Nicotine Administration on Gastric Morphology and Hormonal Secretion in Rats


Abstract:

This study aims to assess the effects of different routes of chronic nicotine administration on gastric morphology and hormonal secretion; mainly gastrin, ghrelin, histamine and prostaglandin E2 (PGE2). Forty adult male albino rats were randomly assigned into four groups (10 rats/ group) as following: control group (given standard rat pellets and water only), oral nicotine treated group (50 μg/ml drinking water), intra-peritoneal (IP) nicotine treated group (0.5 mg/kg b.w.) and inhaled nicotine treated group (0.5 mg/kg b.w.) for 21 days. Levels of gastrin, ghrelin, PGE2, and histamine in serum and gastric tissue homogenates were assessed by ELISA kits. Stomach fundus was processed for histopathology and immunohistochemistry using light and electron microscopes. Different routes of chronic nicotine administration result in significant increase in serum and homogenate gastrin and ghrelin levels and significant decrease in serum and homogenate PGE2 levels compared to control. Moreover, nicotine administration via oral and inhalation routes caused gastric erosion, transformation of peptic cells into mucous variety, significant increase in parietal cells number and increase in gastrin expression. In conclusion, the negative impact of nicotine administration on gastric structure that is associated with increased level of gastrin and decreased level PGE2 might be the leading cause of gastric/peptic ulcers in heavy smokers. Increase ghrelin level and its effect following nicotine chronic administration needs further investigation. Upon these findings we suggest that the gastric structure alteration following chronic administration of nicotine can be prevented by reducing gastrin secretion and/or targeting its receptors.

Keywords:

nicotine - gastrin- ghrelin- gastric morphology – histamine - rats

Published In:

Experimental Physiology , NULL , NULL