Ethanol and nitric oxide modulate expression of glucocorticoid receptor in the rat adrenal cortex

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Abstract:

Background: This study was performed to investigate expression and distribution of glucocorticoid receptor (GR) in the rat adrenal cortex, acute effect of ethanol on its expression and possible role of endogenous nitric oxide (NO) in this phenomenon.

Methods: Adult female Wistar rats showing diestrus day 1 were treated with: a) ethanol (2 or 4 g/kg body weight (b.w.), ip), b) NO-nitro-L-arginine methyl ester (L-NAME), well-known competitive inhibitor of all isoforms of NO synthase (NOS), (30 mg/kg b.w., sc) followed by ethanol (4 g/kg, ip) 3 h later and c) L-NAME (30 mg/kg b.w., sc) followed by saline (ip) 3 h later. Untreated rats were used as controls. Adrenocortical expression of GR was estimated by immunohistochemistry.

Results: Strong nuclear GR staining was observed throughout the cortex of control rats. Acute ethanol treatment significantly decreased the expression of GR in the zona fasciculata and zona reticularis. Blockade of NO formation had no influence on this effect of ethanol, whereas L-NAME itself induced significant decline in GR immunoreactivity.

Conclusions: Obtained findings are the first to demonstrate localization and distribution of the GR throughout the rat adrenal cortex and to suggest that ethanol as well as endogenous NO may modulate adrenocortical expression of this steroid receptor.

Key words:

ethanol, L-NAME, glucocorticoid receptor, adrenal cortex