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Prevention of Nicotine Intoxication by Catatoxic Steroids

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Abstract—In rats, severe and almost always fatal nicotine intoxication can be prevented by various catatoxic steroids such as ethylestrenol, norbolethone, SC-11927, spironolactone and oxandrolone. Conversely, steroids previously shown not to possess catatoxic actions in other test systems, fail to protect against nicotine poisoning.

Introduction

The pharmacologic classification of steroids is based upon the fact that some of their actions are separable and independent, whereas others are merely inseparable subordinate manifestations of one of these basic activities (1). For example, the glucocorticoid, mineralocorticoid, antimineralocorticoid, luteoid (or "gestogenic"), and anesthetic effects of steroids are independent of each other; conversely, the antiphlogistic, thymolytic and ACTH-secretion-inhibiting actions are not separable from glucocorticoid activity, in that no steroid of this latter group possesses one such subordinate manifestation without also exhibiting the others. It has long been known that adrenalectomy decreases the resistance to most toxic agents, whereas substitution therapy with corticoids restores it towards normal by combating nonspecific stress; yet, overdosage with corticoids is singularly ineffective in raising the nonspecific resistance of intact animals above normal, presumably because a near optimal corticoid supply is assured by the physiologic activity of the adrenal cortex (2).

However, several reports from this laboratory have shown that certain steroids (not necessarily endowed with corticoid potency) can protect the intact rat against various types of severe intoxications even in the presence of the adrenal cortex. For example, these "catatoxic steroids" (from the Greek kata = down, against) (3) can induce resistance against steroid anesthesia (4), pentylenetetrazol convulsions (5), the calcinosis elicited by vitamin-D compounds (6–8), digitoxin poisoning (9), the hypnotic action of pentobarbital and methyprylon (10), the adrenal necrosis produced by 7, 12-dimethylbenz(a)anthracene (11), and the perforating jejunal ulcers with peritonitis elicited in the rat by indomethacin overdosage (12).