
Abstract
Ascorbate (Vit.C) and alpha-tocopherol (Vit.E) are highly concentrated in the adrenal. Both vitamins support steroid synthesis in vitro. Vitamin depletion experiments in guinea pigs were done to study the role in aldosterone synthesis of these antioxidants in vivo. We stimulated aldosterone secretion by sodium depletion in vitamin depleted animals and compared the effects with those in vitamin replete guinea pigs. We analysed plasma hormone levels and measured ex vivo steroid secretion by isolated adrenal cells and conversion of [3H]deoxycorticosterone to [3H]aldosterone. Fifteen days of a Vit.C-free diet led to very low Vit.C levels in adrenals, liver and plasma, without signs of scurvy. Plasma ACTH and plasma renin activity (PRA) were not influenced. Vit.C depletion abolished a rise of plasma aldosterone and of aldosterone secreted in vitro stimulated by sodium depletion. The in vitro conversion of [3H]deoxycorticosterone to [3H]aldosterone was reduced and sodium conservation was impaired by Vit.C depletion. Vit.E depletion did not abolish but significantly attenuated the rise in plasma aldosterone stimulated by sodium depletion. Aldosterone secretion by adrenal cells isolated from these animals was suppressed to control levels. Both antioxidants Vit.C and Vit.E seem to play a permissive role in aldosterone synthesis, possibly by protecting the cytochrome P450(11 beta) from lipidperoxides. Vit.C may also act as part of an auxiliary electron transport system for the last step of aldosterone synthesis.