



PARAHYPOPHYSEAL REGULATION OF ADRENAL STEROIDOGENESIS BY ADIPOCYTES

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Abstract

The strong continuous interactions between the central transhypophyseal and parhypophyseal mechanisms have been shown to play an important role by the regulation of the adrenal steroidogenesis. Parhypophyseal mechanisms play an important role during development, functioning and pathological processes of the adrenal gland. The possible participation of adipose tissue in parhypophyseal regulation of the adrenal steroidogenesis has recently been revealed. In accordance with WHO, obesity has become an epidemic problem. Moreover, it is associated with numerous adrenal malfunctions (such as increased cortisol, early pubertal development, hyperaldosteronism promoting arterial hypertension). Therefore, in the present study we tested the possible influence of human adipocyte secretory products on the secretion of cortisol and aldosterone in adrenal cortex. Secretory products from isolated human adipocytes indeed strongly stimulated steroidogenesis both in human adrenocortical cells (NCI-H295R) and in primary culture of bovine adrenocortical cells with a predominant effect on mineralocorticoid secretion. In conclusion, fat tissue takes part in the parhypophyseal regulation of adrenocortical steroidogenesis. Identification and further characterization of these factors should open new ways for the treatment of various obesity-caused endocrine disorders.

Keywords: adrenal gland, adipocytes, steroidogenesis, parhypophyseal regulation

Introduction

Over the past years considerable evidence has been accumulated to change the classical concepts of regulation of adrenocortical steroidogenesis. The strong continuous interactions between the central transhypophyseal and extrahypophyseal (parhypophyseal) mechanisms have been shown to play an important role by the regulation of the adrenal steroidogenesis in normal conditions and in stress reaction (Ehrhart-Bornstein M. et al., 1998). Moreover, parhypophyseal mechanisms play an important role during development, functioning and pathological processes of the adrenal

gland (Mesiano S., Jaffe R., 1997). Local intraadrenal regulatory mechanisms are related to the parhypophyseal regulation of adrenocortical steroidogenesis. These mechanisms function due to the large contacts between cortical and chromaffine cells, as well as due to the peculiarities of the innervations and the blood circulation in the adrenal gland (Hinson J., 1990; Bornstein S. et al., 1994; Dijkstra I. et al., 1996). Adrenomedullary chromaffin cells, vascular endothelium, immune cells, and adrenal nerves release a wide variety of active factors, such as vasopressin (Perraudin V. et al., 1993), atrial natriuretic peptides (Nawata H. et al., 1991), vasoactive intestinal polypeptide (VIP) (Bornstein S. et al., 1996), catecholamines (Ehrhart-

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