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Catecholamines and Diabetes Mellitus

Dear Sir,

The recent survey of Dr. Christensen (1979) on catcholamines and diabetes mellitus covers most of the present knowledge in this field of research. It appears necessary, however, to stress the potential importance of one particular aspect of catecholamine action which has been neglected by the author.

Only recently has it been recognized that chronic elevated or decreased levels of hormones tend to be associated with changes of hormone responsiveness of target tissues. These changes include hormone refractoriness or changes in the qualitative pattern of effects of a number of hormones, including catecholamines [4]. In vitro experiments with human adipose tissue showed that the lipolytic effects of the naturally occurring catecholamines are impaired in untreated juvenile diabetics [1, 2]. This impairment was due to an altered balance of α- and β-adrenergic responsiveness with increased with increased receptivity for both components of catecholamine action. The conclusion of Dr. Christensen that elevated catecholamine levels in untreated insulin-deficient diabetics serve to compensate for volume depletion at the expense of an aggravated metabolic disturbance, is therefore, an overextrapolation. At least in adipose tissue, metabolic disturbance by elevated catecholamine levels is likely to be prevented via an adaptive change of hormone sensitivity at the level of the target tissue.

It is of special interest to clarify the mechanism of this type of adaptive change or hormone responsiveness. This involves questions concerning the modulation of the response to drugs by disease and is pertinent to the actual discussion about the use of β-blocking agents in diabetics. This phenomenon, for instance, may contribute to the fact that carbohydrate tolerance can improve and insulin secretion can increase when mild diabetics are changed from a non-selective β-blocking drug to metroprolol, where as longterm treatment with either propranolol or metroprolol failed to change carbohydrate tolerance in non-diabetic subjects [5]. In addition, the increased responsiveness towards β_2-selective agonists lacking the inhibitory alpha-adrenergic component of action, which was observed by Fredholm et al. [3] in diabetic women, is perhaps due to this type of adaptive change of hormone responsiveness at the level or target tissues.

Dr. Horst Kather Dr. Bernd Simon

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