DAILY PROFILES OF DEHYDROEPIANDROSTERONE AND ITS HYDROXYLATED METABOLITES WITH RESPECT TO FOOD INTAKE

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INTRODUCTION

Dehydroepiandrosterone (DHEA) is a well-known neurosteroid. Its plasmatic level is reduced with ageing in most individuals. A non-negligible portion of DHEA is hydroxylated at C7 and C16 to 7α-, 7β- and 16α- and 16β-hydroxyderivatives. A part of the antiglucocorticoid function of DHEA has been described to its 7-oxygenated metabolites, namely to 7α-hydroxy-dehydroepiandrosterone. Due its anti-glucocoticoid action it is also considered a factor in fat deposition processes. Thus, we were interested in examining daily profiles of DHEA and its metabolites, as well as possible associations with the daily variation of hormones associated with food intake.

METHODS

8 women of reproductive age with normal body mass index were given 5 standardised meals, and their hormonal milieu was determined during the course of the day. Plasma from 12 withdrawals was analysed for dehydroepiandrosterone and its 7- and 16-hydroxylated metabolites.

RESULTS

C-peptide and glucose showed a pattern dependent on food intake, with a significant maximum 1 an 2 hours after lunch and dinner (Figure 1A and B), but not 1 or 2 hours after snacks. Cortisol (Figure 1C) had a nearly steady decrease throughout the day, with no significant association with food intake in the intervals 1 or 2 hours after food intake. Free DHEA showed a small but significant decrease after lunch and dinner, whereas conjugated DHEA decreased only after dinner (Figure 2A and B). Androstenediol decreased after lunch, but other changes were not significantly influenced by meals (Figure 2C). 7α-hydroxydehydroepiandrosterone (Figure 3A) and 3β,7α,17β-hydroxy-androstenetriol (Figure 4A) followed the profile of DHEA, but 7β-isomer (Figure 3B), 7-oxoderivative (Figure 3C) and 3β,7β,17β-hydoxy-androstenetriol (Figure 4B) did not. DHEA and all its derivatives showed an increase at 10 or 11 p.m., which, however, was significant only for free and conjugated DHEA, 7β-hydroxy-DHEA and 16α-hydroxy-DHEA (Figure 4C). These increased values were very probably not connected with meal intake, as glucose ad C-peptide were, being not elevated any more one or two hours after the intake of a small snack.

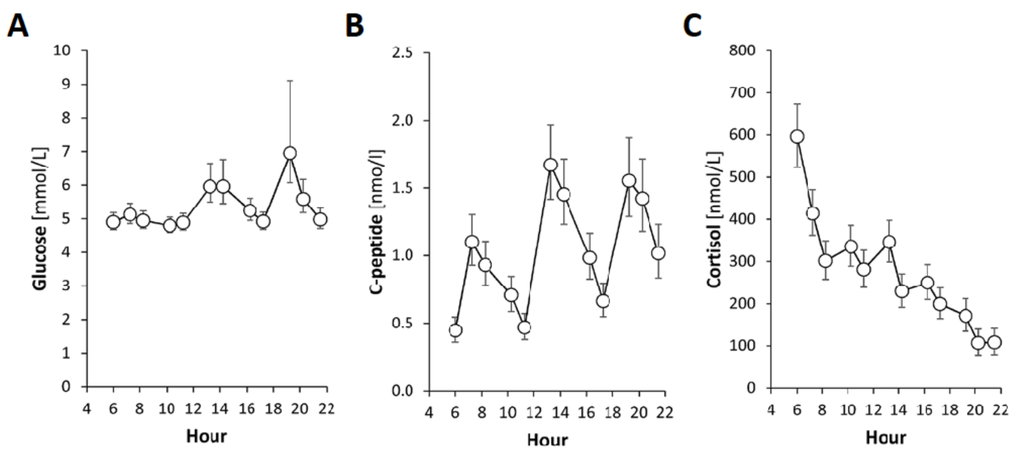

Figure 1 *– Daily profile of substances related to food intake: A) glucose; B) C-peptide; C) cortisol.*

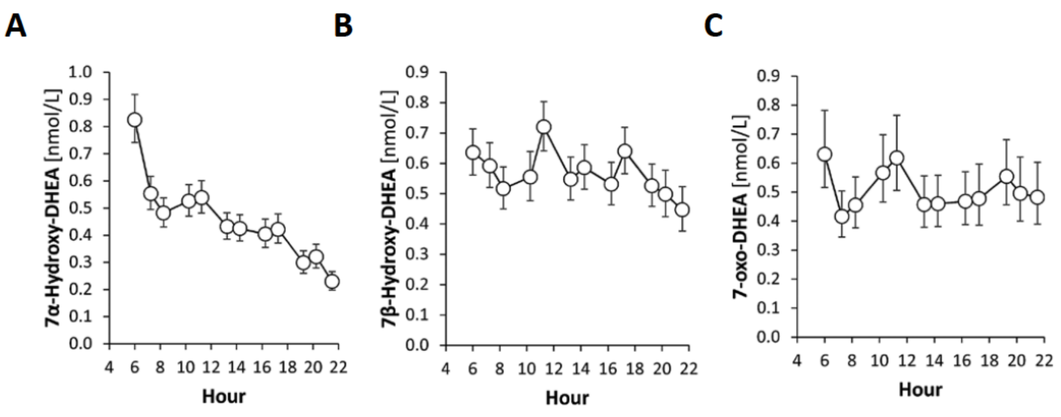

Figure 3 *– Daily profile of 7-oxygeneted metabolite of dehydroepiandrosterone: A) 7α-hydroxydehydroepiandrosterone; B) 7β-hydroxy-dehydroepiandrosterone; C) 7-oxo-dehydroepiandrosterone.*

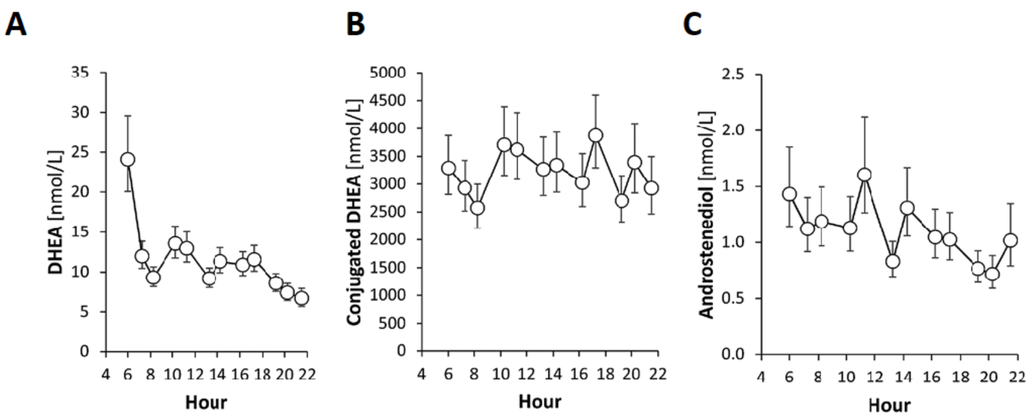

Figure 2 *– Daily profile of dehydroepiandrosterone and its metabolites: A) free dehydroepiandrosterone; B) conjugated dehydroepiandrosterone; C) androstenediol.*

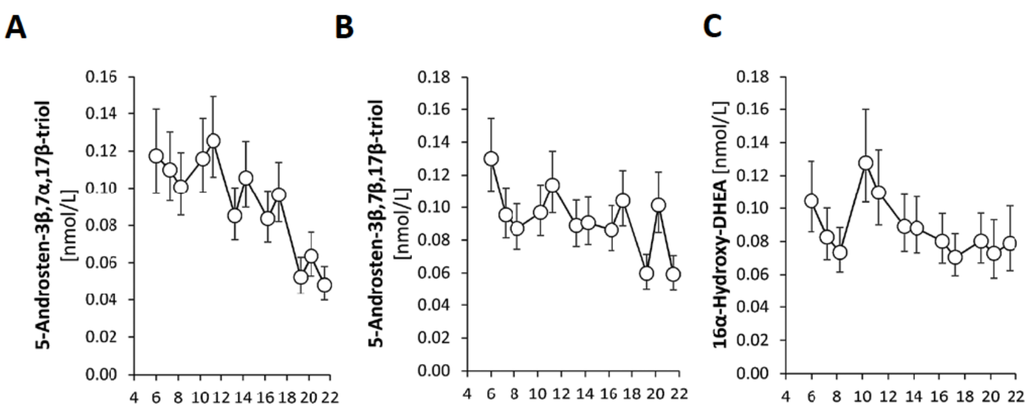

Figure 4 *– Daily profile of hydroxylated metabolites of dehydroepiandrosterone: A) 5-androstene-3β,7α,17β-triol; B) 5-androstene-3β,7β,17β-triol; C) 16α-hydroxy-dehydroepiandrosterone.*

CONCLUSIONS

The daily profile of dehydroepiandrosterone levels shows a decrease throughout the day from the highest values in the morning value, with additional significant decreases after main meals. Only some hydroxylated metabolites and conjugated derivatives show a similar profile.

The project was supported by Internal Grant Agency of the Ministry of Health, Czech Republic - NT-12340 and GAUK 1254314 from the Charles University in Prague.