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Serum immunoreactive relaxin in women during a 24-h period

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Summary. Serum relaxin concentrations were measured every 30 min during a 24-h period in nonpregnant and pregnant women. Relaxin was undetectable in all serum samples obtained from 3 nonpregnant women. Relaxin was detectable in all serum samples obtained from 2 pregnant women. However, neither episodic secretion of relaxin nor a 24-h rhythm in relaxin secretion was discernible in these women.

Introduction

Bryant *et al.* (1976) reported that relaxin was secreted episodically in humans. They also detected a 24-h rhythm in relaxin secretion. If relaxin is secreted episodically, frequent blood sampling is necessary for estimation of relaxin secretion. There are two radioimmunoassays which measure immunoreactive relaxin in humans. One was developed by Bryant (1972), and the other was developed by Sherwood *et al.* (1975) and modified by O'Bryne & Steinetz (1976). The two methods gave different results for circulating relaxin concentrations. Relaxin was readily detected in blood of men and nonpregnant women by the former assay (Bryant *et al.*, 1976), but was almost undetectable by the latter assay (O'Bryne *et al.*, 1978; Quagliarello *et al.*, 1980; Thomas *et al.*, 1980). Furthermore, the specificity of the former assay is questionable (Schwabe *et al.*, 1978). However, a 24-h secretory pattern of relaxin has not heretofore been evaluated in humans using the radioimmunoassay of O'Bryne & Steinetz (1976). We have therefore tried to measure relaxin concentrations in nonpregnant and pregnant women to determine whether there is a 24-h secretory pattern.

Materials and Methods

Three normal cyclic women aged 23, 25 and 28 years, studied during the mid-luteal phase, and 2 normal pregnant women (first trimester) aged 25 and 29 years were the subjects of this study. All were healthy, none had ever received hormone therapy or was taking drugs. All subjects slept in the same room for at least 2 days before examination. Blood samples were obtained from each subject every 30 min through an indwelling catheter placed in a wrist vein. During this study, normal feeding was continued at 08:00, 12:00 and 17:00 h, although activity was restricted to the patient's room. Lights were turned off between 21:00 and 06:00 h. Relaxin was measured by radioimmunoassay with ^{125}I-labelled polytyrosyl relaxin and rabbit antiporcine relaxin serum R6, as previously described (Seki *et al.*, 1986). The sensitivity of the assay was 200 pg/ml. The intra- and inter-assay coefficients of variation were 6·6 and 9·3%, respectively.

Results

Immunoreactive relaxin was undetectable in all serum samples obtained from the 3 nonpregnant women. Relaxin was detected in all serum samples obtained from the 2 pregnant women. The mean ($\pm$s.d.) 24-h relaxin concentrations in these 2 pregnant women were $0{\cdot}65 \pm 0{\cdot}07$ and $0{\cdot}86 \pm 0{\cdot}04$ ng/ml, respectively. Neither episodic secretion of relaxin nor a 24-h rhythm in relaxin secretion was discernible in these women (Fig. 1).

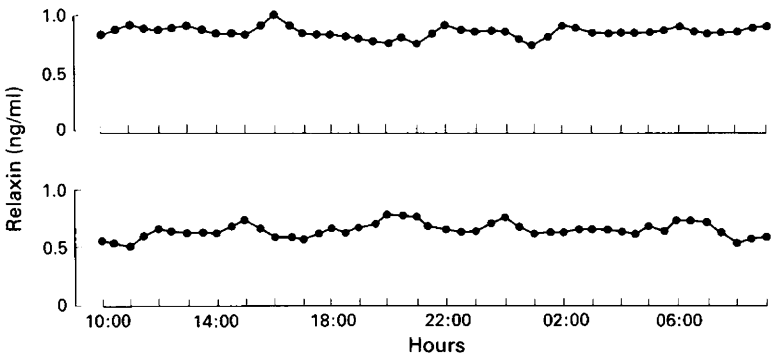

Fig. 1. The serum relaxin immunoactivity of samples collected every 30 min from 2 pregnant women during the first trimester.

Discussion

Relaxin was detectable in serum samples of pregnant women, but not in those of nonpregnant women. This is in agreement with the results of previous studies in which radioimmunoassays for relaxin similar to our radioimmunoassays were used (O'Bryne *et al.*, 1978; Quagliarello *et al.*, 1980; Thomas *et al.*, 1980), but not with the result of Bryant *et al.* (1976). In contrast to the result of Bryant *et al.* (1976), neither episodic secretion of relaxin nor a 24-h rhythm in relaxin secretion was detected in sera from the pregnant women in this study. The radioimmunoassay of Bryant (1972) was based on porcine relaxin (NIH-R-P1), subsequently recognized to have only about 15% activity with respect to relaxin (Schwabe *et al.*, 1978). The radioimmunoassay of Sherwood *et al.* (1975) was based on purified porcine relaxin prepared by the then new method of Sherwood & O'Bryne (1974). Purified relaxin was not available until 1974. This could explain the differences between the result of Bryant *et al.* (1976) and ours. If relaxin is not secreted episodically, then repeated short-interval blood sampling is not necessary for estimation of relaxin secretion. However, there is a precedence in the relaxin field for an homologous radioimmunoassay giving a different pattern of results than a heterologous radioimmunoassay. Diurnal rhythms in relaxin secretion have been shown in late pregnancy in the rat and sow by homologous radioimmunoassays (Sherwood *et al.*, 1981, 1983). It may be premature to reach any definite conclusion as to the secretory pattern of relaxin in women, until an homologous radioimmunoassay for human relaxin is established. Previous studies using the R6-polytrosyl radioimmunoassay system have indicated that the corpus luteum of pregnancy is the main source of circulating relaxin in normal pregnancy (Weiss *et al.*, 1976). Therefore, considering the present findings, it seems unlikely that the corpus luteum of pregnancy has its own rhythmicity or is under any rhythmic stimulation to secret relaxin.

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