Messenger Ribonucleic Acid Expression of KiSS-1 and Serum Level of Kisspeptin in Rat at Different Developmental Stages

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Abstract

KiSS-1 and its product, kisspeptin is necessary for puberty onset and proper adult gonadal function due to its stimulatory effect on the secretion of GnRH. Although the pathophysiological importance of KiSS-1 and kisspeptin is well known, the developmental patterns of expression of KiSS-1 genes and serum level of kisspeptin have not been explored to date.

Objectives

We report herein the expression profile of KiSS-1 genes and serum level of kisspeptin in the rat at different developmental stages.

Methods

Sprague-Dawley (SD) strain female rats were used. To analysis expression of KiSS-1 mRNA, samples were obtained from hypothalamus, pituitary, ovaries, adrenal glands and pancreas in female rats at 4 day, 8 day, 14 day, 23 day, 27 day, 34 day, 38 day and 40 day. At the same time, blood samples were collected for analysis serum level of kisspeptin and luteinizing hormone (LH). The expression of KiSS-1 mRNAs was assessed by RT-PCR and the serum levels of kisspeptin and LH were analyzed by ELISA.

Results

The expressions of KiSS-1 gene in hypothalamus and ovary were increased according to developmental stages and were peaked at prepubertal stage (at day 27, respectively, 0.88 ± 0.22, 0.54 ± 0.25). However, there were no significant changes or correlations between developmental stages and KiSS-1 gene expression in pituitary, adrenal glands and pancreas. Serum kisspeptin level was increased according to developmental stages as KiSS-1 gene mRNA expression. However, peak level of kisspeptin (35.43 ± 3.60 pg/mL) was in pubertal stage at day 34. Serum LH level was also increased and peaked (23.29 ± 15.24 ng/mL) at pubertal stage (at day 38) as serum kisspeptin level. However, an increasing pattern was little delayed than that of kisspeptin level.

Summary

The expressions of KiSS-1 mRNA were increased in hypothalamus and ovary according to developmental stages in rat. Serum levels of kisspeptin were also increased during developmental stages, followed by serum LH levels. Furthermore, the peak expression of KiSS-1 mRNA and the peak serum levels of kisspeptin and LH were observed during prepubertal and pubertal stages in regular sequence. Therefore, serum kisspeptin levels can be an indication of KiSS-1 gene expression in hypothalamus and pubertal onset.

Conclusions

The expressions of KiSS-1 mRNA were increased in hypothalamus and ovary according to developmental stages in rat. Serum levels of kisspeptin were also increased during developmental stages, followed by serum LH levels. Furthermore, the peak expression of KiSS-1 mRNA and the peak serum levels of kisspeptin and LH were observed during prepubertal and pubertal stages in regular sequence. Therefore, serum kisspeptin levels can be an indication of KiSS-1 gene expression in hypothalamus and pubertal onset.

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