Bull. Inst. Zool., Academia Sinica **19**(1): 39-41 (1980)

SCIENTIFIC NOTE

PRELIMINARY REPORT ON SERUM PRL IN POSTPARTUM SOWS FOLLOWING TRH TREATMENT[1]

GIN WU[2], W. CHIA-MO WAN[3,5], CHING-FONG LIAO[3] and YU-HAI KOU[4]

(Received November 15, 1979)

It is known that the serum prolactin (PRL) elevated in various animals and the human[1-3,5] after thyrotropin-releasing hormone (TRH) treatment, and it is also known PRL is one of the important hormones that are responsible for milk production. Previous observations indicated that intramuscular injection (IM) of TRH to postpartum sows increased the daily weight-gain of their youngs[10]. It was speculated that the weight-gain increase in those nursing youngs was due to an increase of milk production caused by PRL release.

In this report, postpartum sows were subjected for TRH treatment, and serum PRL were measured by radioimmunoassay (RIA). Purified porcine PRL was used as the immunogen for antisera production, the reference material for RIA, and for radioiodination.

Postpartum sows of Landrace purebred with 8 piglets/litter at the time 14 days after giving birth were subjected to TRH treatment by IM, intravenous (IV) and oral (OR) administration. Four days were allowed the sows to acclimate in metabolic cages. In these cages the sows were able to nurse their youngs without difficulty. An adjacent cage which connected to the main cage for the sows was provided room for the piglets to move freely. Blood collection and hormone injection were through an indwelling ear vein catheter which was implanted right after the sow was moved into the metabolic cage.

In production of antisera, 0.2 mg of porcine PRL was dissolved in 1 ml of phosphate buffer saline (PBS, 0.01 M phosphate buffer and 0.15 M NaCl, PH 7.6) and emulsified with an equal volume of complete Freund's adjuvant for the first inoculation to albino rabbits. In challenging injections, 0.03 mg of PRL and incomplete adjuvant were used as described by other investigators[9].

Competition of porcine GH, LH and FSH and ovine TSH with ^{125}I-PRL for binding to the antiserum was observed, there is no significant cross-reactivity. In this arrangement, no direct evidence could be provided for the absence of cross-reactivity with porcine TSH with the antiserum. However, in an attempt to match the tryptic peptide of human GH with

1. We thank Dr. John B. Mills of Emory University School of Medicine (for porcine GH) and National Institute of Health, U. S. A., (for porcine PRL, LH, FSH and ovine TSH) for their generosity in supplying hormones to us, and Animal Industry Research Institute, Taiwan Sugar Cooperation for using their animals and facilities, and Dr. T. S. Yang of the Pig Research Institute-Taiwan for technical advice.

2. Department of Veterinary Medicine, College of Agriculture, National Taiwan University, Taipei.
3. Institute of Zoology, Academia Sinica, Taipei.
4. Pig Research Institute-Taiwan, Chunan.
5. To whom reprint request should be addressed.

Paper No. 212 of the Journal Series of the Institute of Zoology, Academia Sinica.

human PRL, the data, which is in agree with immunological findings, have shown that human PRL does not cross-react with human GH but with non-primate PRL[8]. It is possible that ovine TSH may bind to antibody which only cross-react with porcine TSH. As previously reported, no significant increase of serum thyroxine in postpartum sows was found after TRH treatment[10]. In addition, the stimulation of TRH on the release of endogenous thyroid hormone was within normal range[7]. Thus, it seems no reason to suspect it was not measuring serum PRL by using the antiserum.

Chloramin-T method was employed for radioiodination for porcine PRL. The RIA procedure were followed that for human PRL with minor modifications[4]. Reference materials or serum samples were mixed with a volume of PBS-1% bovine serum albumin that will bring the volume to 500 μl before the addition of other components for RIA. The incubation time were 24 hrs after ^{125}I-PRL and 24 hrs after goat anti-rabbit gamma globulin antiserum addition. All incubations were done at 4°C.

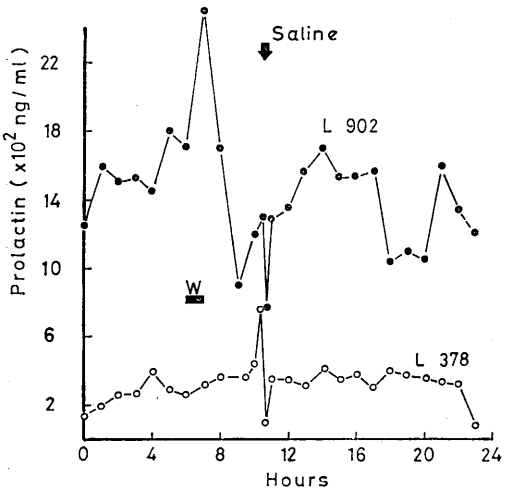

Fig. 1. Serum prolactin level at 24 h interval during lactation of 2 sows. They had been acclimated for 4 days in metabolic cages and nurse their youngs at will. W: Wake-up. Saline: saline injection through indwelling ear vein catheter.

Fig. 1 shows 24 hrs variations of serum PRL of two sows. Minor disturbances, such as wake-up or saline injection, changed serum PRL level. With 50 μg/head IV of TRH an elevation of serum PRL can be observed in one sow (Fig. 2), but the fluctuations, possibly from injection, obscured the effect of TRH in the other. In IM injection, no clear PRL changes could be related to the TRH stimulation (Fig. 3).

In OR administration, 500 μg TRH were mixed in a very small portion of feed that was given to the sow before regular ration. It is

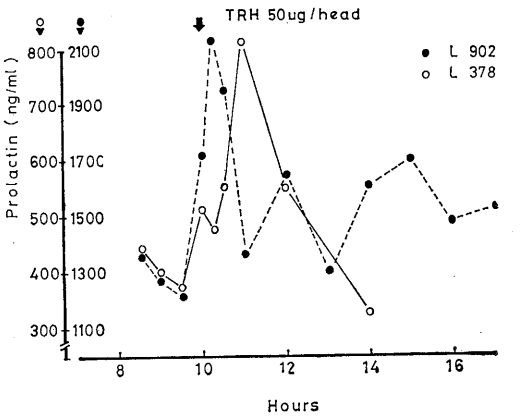

Fig. 2. Serum prolactin variations after an iv injection of TRH in lactating sows.

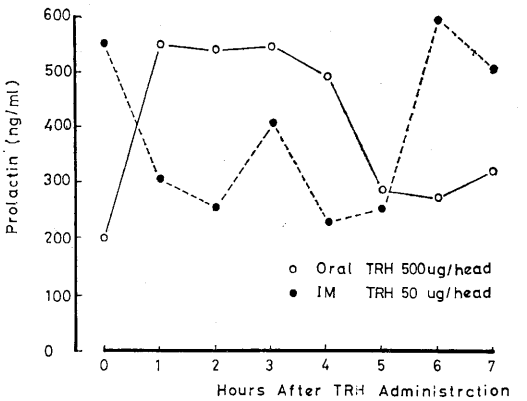

Fig. 3. A comparison of serum prolactin variations after intramuscular injection (*M. Brachiocephalicus*) and oral feeding of TRH.

apparent that serum PRL elevated within 1 hr after the treatment and gradually reach to a plateau. Declination of the hormone was observed after 4 hrs of the treatment. And serum PRL back to the basal level 5 to 6 hrs after.

The present report intended to demonstrate that the best route for TRH administration in sows is through oral feeding. There are some variations of serum PRL due to stressful stimulation[6], no matter how minor, by any other route of the administration.

REFERENCES

1. CONVEY, E. M., H. A. TUCKER, V. G. SMITH and J. ZOLMAN. (1973). Bovine prolactin, growth hormone, thyroxine and corticoid response to the thyrotropin-releasing hormone. *Endocrinology* **92**: 471-476.
2. DAVIS, S. L. and M. L. BORGER. (1972). Prolactin secretion stimulated by TRH. *J. Anim. Sci.* **35**: 239. (Abstr.)
3. DEIS, R. P. and N. ALONSO. (1975). Effect of synthetic thyrotropin-releasing factor on prolactin and luteinizing hormone secretion in male and female rats during various reproductive states. *J. Endocr.* **67**: 425-430.
4. JACOBS, L. S., I. K. MARIZ and W. H. DAUGHADAY. (1972). A mixed heterologous radioimmunoassay for human prolactin. *J. Clin. Endocr.* **34**: 484-490.
5. JACOBS, L. S., P. J. SNYDER, R. D. UTIGER and W. H. DAUGHADAY. (1973). Prolactin response to thyrotropin-releasing hormone in normal subjects. *J. Clin. Endocrinol. Metab.* **36**: 1069-1073.
6. RAUD, H. R., C. A. KIDDY, and W. D. ODELL. (1971). The effect of stress upon the determination of serum prolactin by radioimmunoassay. *Proc. Soc. Exp. Biol. Med.* **136**: 689-693.
7. REICHLIN, S. (1966). Control of thyrotropic hormone secretion. In L. Martin, and W. F. Ganong (Ed.) Neuroendocrinology Vol. 1. Academic Press, New York.
8. SEAVEY, B. K., R. N. P. SINGH, T. T. LINDSEY and U. J. LEWIS. (1973). Comparison of the trypic peptides of human, porcine and ovine prolactins. *Gen. Comp. Endocrinol.* **21**: 358-367.
9. VAITUKAITIS, J., J. B. ROBBINS, N. NIESCHLAG, and G. T. ROSS. (1971). A method for producing specific antisera with small doses of immunogen. *J. Clin. Endocrinol.* **21**: 358-367.
10. WUNG, S. C., H. P. WU, Y. H. KOU, K. H. SHEN, F. K. KOH. and W. C. M. WAN. (1977). Effect of thyrotropin-releasing hormone on serum thyroxine of lactating sows and the growth of their suckling youngs. *J. Anim. Sci.* **45**: 299-304.

甲狀腺刺激素之釋放激素 (TRH) 對產後母豬泌乳素之影響

吳　均　萬家茂　廖欽峯　郭有海

產後母豬在代謝籠中適應4日後以血管肌肉注射，及口服 TRH，測定血液中泌乳素之改變。初步發現肌肉注射對血液中泌乳素之改變無規律之現象，可能針刺的逼迫影響結果。血管注入雖見明顯之上升，但以 50 μg/隻最明顯，小於此量則見不規則之改變，口服時泌乳素上升及下降極爲平穩，但以 500 μg 之量是否合適尚需研究。