



## **Effect of growth hormone-releasing factor (1-29)NH<sub>2</sub> and thyrotropin-releasing factor on growth hormone release in lactating sows (1)**

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**Effect of growth hormone-releasing factor (1-29)NH<sub>2</sub> and thyrotropin-releasing factor on growth hormone release in lactating sows<sup>(1)</sup>**

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**Résumé.** Vingt-six truies en lactation ont reçu les traitements suivants : 1) solution saline physiologique ; 2) somatocrine ou hGRF(1-29)NH<sub>2</sub> (20 µg.kg<sup>-1</sup>) ; 3) thyroïdolibérine (TRF) (1 µg.kg<sup>-1</sup>) ; 4) combinaison de GRF et de TRF (20 et 1 µg.kg<sup>-1</sup> respectivement). La solution saline ou les peptides ont été injectés par voie sous-cutanée, deux fois par jour, du 5<sup>e</sup> au 25<sup>e</sup> jour post-partum. Les niveaux sériques de la GH aux jours 5, 15 et 25 révèlent que : 1) la réponse de la GH au hGRF (1-29)NH<sub>2</sub> s'est accrue avec le nombre de jours d'injection et/ou de lactation ; 2) le TRF, à la dose utilisée, n'a pas induit ou stimulé la libération de la GH lorsqu'injecté seul et/ou en combinaison avec le GRF ; 3) la réponse de la GH au hGRF(1-29)NH<sub>2</sub> n'a pas été différente entre l'injection de 10 h et celle de 16 h.

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Human growth hormone-releasing factor (hGRF(1-44)NH<sub>2</sub>) has been shown to be a potent stimulator of growth hormone (GH) release *in vitro* and *in vivo* in different species including swine (Kraft *et al.*, 1985). The hGRF(1-29)NH<sub>2</sub> fragment has the same first 29 amino acid sequence as human and porcine GRF(1-44)NH<sub>2</sub> (Böhlen *et al.*, 1983). On a molar basis, both hGRF(1-44)NH<sub>2</sub> and hGRF(1-29)NH<sub>2</sub>, have the same potency on GH release *in vivo* in pigs and calves (Petitclerc *et al.*, 1986). Repeated administration of hGRF has been reported to sustain GH release in cattle (Lapierre *et al.*, 1986). GRF and thyrotropin releasing factor (TRF) were found to act in synergy on GH release in cattle (Hodate *et al.*, 1985). The objective of the present study was to determine the effect of hGRF(1-29)NH<sub>2</sub>, TRF and their combination on GH release in lactating sows.

Twenty-six first litter purebred Yorkshire sows were used. Standard feeding and management conditions were used for all sows. On day 110 of gestation, sows were put into farrowing pens ; on day 113, parturition was induced on 4 sows every week (block). On day 2 post-partum, sows were surgically cannulated using indwelling jugular cannula. On day 3, litter size was standardized to 8 or 9 piglets. Sows were randomly assigned the following treatments : 1) saline ; 2) hGRF(1-29)NH<sub>2</sub> (20 µg.kg<sup>-1</sup>) ; 3) TRF (1 µg.kg<sup>-1</sup>) ; 4) hGRF + TRF (20 and 1 µg.kg<sup>-1</sup> respectively). Saline and peptides were injected subcutaneously twice daily (10 h and 16 h) from day 5 to day 25 post-partum, inclusively. hGRF(1-29)NH<sub>2</sub> and TRF were synthesized by solid phase methodology and purified by

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(<sup>1</sup>) Lennoxville Research Station, Contribution No. 86.

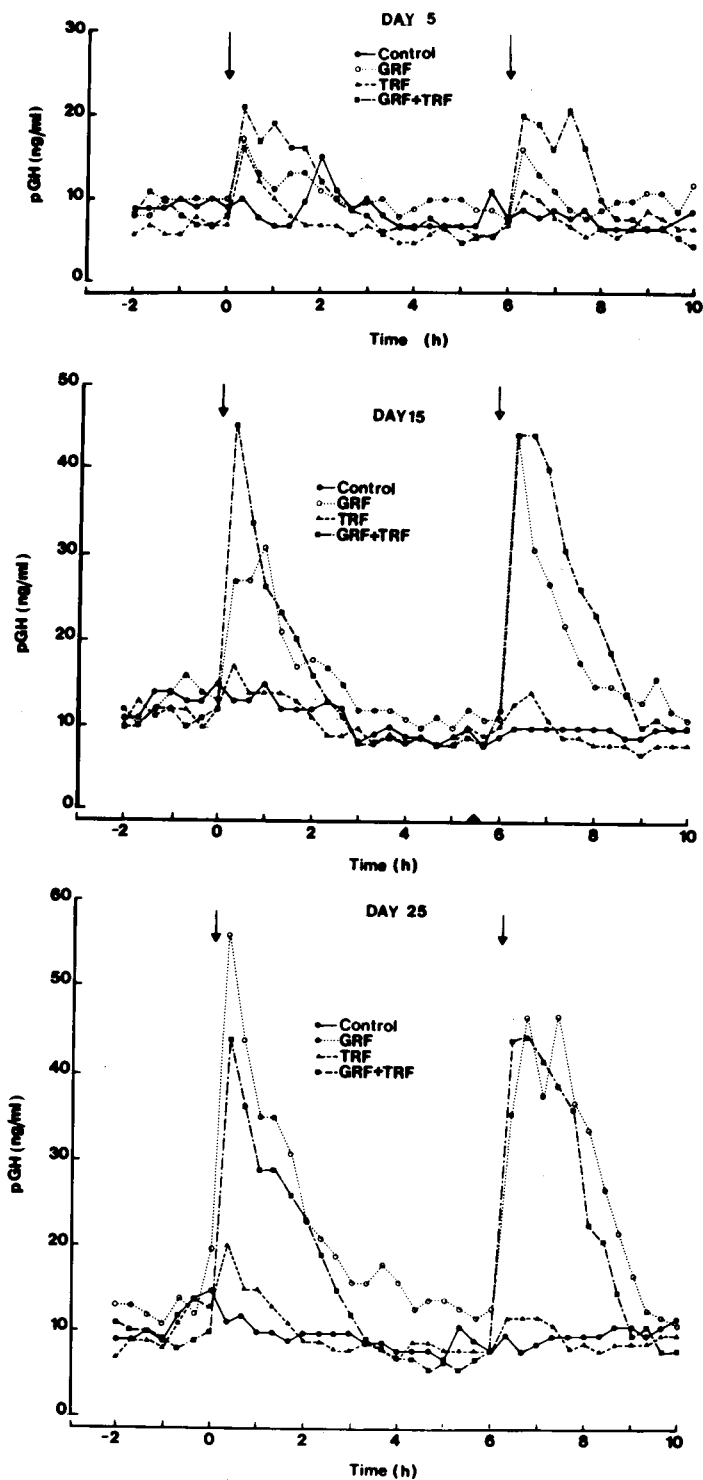


FIG. 1. — Serum growth hormone (pGH) pattern following s.c. injections at 10 h and 16 h (arrows) of saline ( $n = 6$ ), growth hormone-releasing factor (GRF(1-29)NH<sub>2</sub>) (20  $\mu$ g/kg) ( $n = 7$ ), thyrotropin-releasing factor (TRF) (1  $\mu$ g/kg) ( $n = 7$ ) and combination of GRF(1-29)NH<sub>2</sub> and TRF (20 and 1  $\mu$ g/kg respectively) ( $n = 6$ ) in lactating sows.

HPLC. Blood samples were collected every 20 min for a 12 h period (8 h to 20 h) on days 5, 15 and 25 post-partum. Sera were stored at  $-20^{\circ}\text{C}$  until assayed for GH. Areas under the GH curve were calculated for each animal and analysed by analysis of variance with blocks ( $n = 7$ ), days ( $d = 5, 10, 15$ ) and times of injection (10 and 16 h) as main factors.

Patterns of serum GH concentration for each treatment are shown in figure 1. Saline and TRF injection did not increase ( $P > 0.05$ ) GH release in lactating sows. GRF increased ( $P < 0.0001$ ) GH release at each day of sampling : area under the GH response curve was  $2\,614 \pm 112$ ,  $4\,591 \pm 394$ ,  $6\,742 \pm 743$  ng.min.ml<sup>-1</sup> for day 5, 15 and 25 post-partum, respectively. The response of GH to GRF injection was higher ( $P < 0.0001$ ) on days 15 and 25 as compared to day 5 and higher ( $P < 0.0001$ ) on day 25 as compared to day 15. This is the first report showing an increased responsiveness of GH after chronic injection of GRF in swine. Lapierre *et al.* (1986) reported similar results with cows injected during 28 days with hGRF(1-29)NH<sub>2</sub>. It seems that the sensitivity of the acidophil cells is increased by chronic injection of GRF or by advancing lactation. However, we did not observe any significant changes of GH level in control sows during lactation whereas, in lactating cows, the level of GH decreased with advancing lactation.

GH response after GRF and TRF administration, at the doses used, was not higher than that of GRF alone. These results are not in agreement with those observed in cattle (Hodate *et al.*, 1985) where TRF and GRF were shown to act in synergy on GH release. These results are promising for the future use of GRF to stimulate endogenous GH release in order to improve lactation or growth performance in swine.

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