

The regulation of gonadotrophin secretion in male

P. FRANCHIMONT, A. DEMOULIN, J.-P. BOURGUIGNON, R. SANTEN

*Laboratory of Radioimmunoassay Gynecology and Obstetric's Department
Pediatric Department, University of Liège (Belgium)*

RÉSUMÉ

La régulation de la sécrétion de gonadotropine chez l'individu de sexe masculin

La libération sélective de FSH et celle de LH sont conditionnées par les propriétés de l'antéhypophyse, par l'exposition préalable à la gonadolibérine (Gn RH), ainsi que par des influences, inhibitrices ou stimulantes selon le cas, exercées sur les cellules gonadotropes par les diverses hormones gonadiques — dont l'inhibine.

The gonadotropins appear to be secreted by a single pituitary cell type, and this release is controlled by a single hypothalamic factor stimulating the release of LH and of FSH. At the pituitary level, the release of FSH or LH is controlled by a modulation of the rate of gonadotropin synthesis and reserve secretory capacity. The selective release of the two gonadotropins is determined by the intrinsic properties of the pituitary, by the degree of previous exposure to releasing factors and by the extrinsic feedback influence of various hormonal substances.

With respect to the intrinsic properties of gonadotropin secretion, experiments using human fetal and adult rat pituitary cultures demonstrated a preferential secretion of FSH. A similar phenomenon occurs in those physiologic and pathologic circumstances where the hypothalamic pituitary-axis has not yet been exposed to releasing factors or gonadal steroids. These later data appear to provide evidence that predominant secretion of FSH by the gonadotropin cells is an intrinsic property. In contrast, the secretion of LH is minimal under these same experimental and clinical conditions. FSH secretion would depend upon inhibitory factors.

Mots-clés : Gonadotrophine. Inhibine.

Tirés à part : P. Franchimont, adresse ci-dessus.

Inhibin originating from testicular and ovarian sources may be implicated in this negative feedback control system for FSH. Its effects, however, are probably exerted synergistically with those of the gonadal steroids.

Other factors which are as yet unidentified and originate from hypothalamus or pineal may similarly play a role in the modulation of the autonomous secretion of FSH.

In contrast, the regulation of the secretion of LH depends upon stimulatory factors. These, which stimulate the synthesis and the secretion of LH, are represented by LH-RH and, under certain conditions, gonadal steroids and particularly the estrogens.

This mode of regulation, inhibitory for FSH and stimulatory for LH, is not absolute but merely preferential. In effect, the inhibitory factors exert a maximum effect on FSH but also to a lesser extent on LH. This concept of preferential action applies equally to the estrogens as to inhibin.

Conversely, LH-RH stimulates considerably the synthesis and release of LH and, to a lesser degree and more slowly, exerts a positive effect on the levels of FSH. This hypothesis does not exclude other extrinsic gonadotrophin secretory patterns which could modulate the hypothalamus and the gonadotroph functions.

REFERENCES

1. Franchimont (P.) and Roulier (R.). — In : « Clinical Endocrinology », Besser M. and Martini L., Eds., *Academic Press*, 1977, Inc., New York, 197-212.
2. Franchimont (P.), Chari (S.), Hazee-Hagelstein (M. T.), Debruche (M. L.) and Duraiswami (S.). — In : « The testis in normal and infertile men », Troen E. and Nankin H. R., Eds., *Raven Press*, 1977, New York, 253-270.
3. Franchimont (P.), Demoulin (A.), Verstraelen-Proyard (J.), Hazee-Hagelstein (M. T.), Walton (J. S.) and Waites (G. M. H.). — In : « The 5th Annual Workshop on the Testis : Endocrine approach to male contraception », *Int. J. Andrology*, 1978, Suppl. 2, 69-80.
4. Pasteels (J. L.), Sheridan (R.), Gaspar (S.) and Franchimont (P.). — *Molecular and Cellular Endocrinology*, 1977, 9, 1-19.
5. Steinberger (A.) and Steinberger (E.). — In : « The Testis in normal and infertile men », Troen E. and Nankin H. R., Eds. *Raven Press*, 1977, New York, 271-279.