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Endocrinologic Control of Men's Sexual Desire and Arousal/Erection

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ABSTRACT

Introduction: Several hormones and neurotransmitters orchestrate men's sexual response, including the appetitive (sexual desire) and consummative (arousal and penile erection) phases.

Aim: To provide an overview and recommendations regarding endocrinologic control of sexual desire and arousal and erection and their disturbances.

Methods: Medical literature was reviewed by the subcommittee of the International Consultation of Sexual Medicine, followed by extensive internal discussion, and then public presentation and discussion with other experts. The role of pituitary (prolactin, oxytocin, growth hormone, and α-melanocyte-stimulating hormone), thyroid, and testicular hormones was scrutinized and discussed.

Main Outcome Measures: Recommendations were based on grading of evidence-based medical literature, followed by interactive discussion.

Results: Testosterone has a primary role in controlling and synchronizing male sexual desire and arousal, acting at multiple levels. Accordingly, meta-analysis indicates that testosterone therapy for hypogonadal individuals can improve low desire and erectile dysfunction. Hyperprolactinemia is associated with low desire that can be successfully corrected by appropriate treatments. Oxytocin and α-melanocyte-stimulating hormone are important in eliciting sexual arousal; however, use of these peptides, or their analogs, for stimulating sexual arousal is still under investigation. Evaluation and treatment of other endocrine disorders are suggested only in selected cases.

Conclusion: Endocrine abnormalities are common in patients with sexual dysfunction. Their identification and treatment is strongly encouraged in disturbances of sexual desire and arousal.

Key Words: Sexual Desire; Erectile Dysfunction; Testosterone

INTRODUCTION

Cells communicate with one another through a discrete flow of molecules that consistently influence their behavior and activity. Two distinct classes of communicating molecules are recognized and classified according to their origin and fate: neurotransmitters and hormones. Hormones often are derived from endocrine glands and reach their target cells through the bloodstream, whereas neurotransmitters are locally generated and bioactive within the synaptic cleft. However, some communicating molecules often act as a neurotransmitter or as a hormone (eg, noradrenaline, OT, and α-MSH). Any interference with endocrine cell-to-cell communication because of over- (hyper-) or under- (hypo-) flow results in pathologic conditions. Because communication is very important in the dyadic field of sexual medicine, it obvious that endocrine disorders can greatly affect the sexual brain (desire) and the sexual body (arousal and erection).

This article presents a summary of the main endocrine control of men's sexual desire and arousal and erection as discussed by the authors at their presentation at the Fourth International Consultation of Sexual Medicine (Madrid, Spain, June 2015). After the past three International Consultations on Sexual Medicine, significant advances in the understanding of the endocrinology of male sexual function

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RECOMMENDATIONS

Recommendation 1
- Testosterone (T) significantly contributes to the regulation of male sexual desire (level 1A), and T treatment (TTh) can improve libido in hypogonadal (total T < 12 nmol/L) men (level 1A).
- T evaluation is strongly recommended in all men complaining of decreased sexual desire (level 1A).

Recommendation 2
- Dihydrotestosterone (DHT) and estrogens play a minor role in the regulation of male sexual desire (level 2B).
- DHT and estradiol (E2) evaluations are not recommended in men complaining of decreased sexual desire (level 3B).

Recommendation 3
- Adrenal hormones, including dehydroepiandrosterone (DHEA) and its sulfate (DHEAS; level 2A), and cortisol and aldosterone (level 3B) are not involved in the regulation of male sexual desire.
- Adrenal hormone evaluation is not recommended in men complaining of decreased sexual desire (level 1A).

Recommendation 4
- Prolactin (PRL) plays a major role in regulating male sexual desire (level 2A), acting through direct and indirect pathways (level 3B).
- PRL levels should be evaluated in all men complaining of decreased sexual desire (level 2A).
- Treating hyperprolactinemia restores sexual desire (level 2A).

Recommendation 5
- The contribution of thyroid hormones (THs) in the regulation of male sexual desire is contradictory (level 3B).
- TH evaluation is not recommended in men complaining of decreased sexual desire (level 2B).

Recommendation 6
- T regulates penile development and growth in early life, but not after puberty (level A).
- T targets several molecular pathways involved in the physiology of erections, including the nitric oxide and cyclic guanosine monophosphate (NO-cGMP) pathway (level A), RhoA-ROCK signaling, adrenergic response, and cavernous smooth muscle cell (SMC) turnover (level B).

Recommendation 7
- The decrease of circulating T levels is associated with a decrease in erectile function (EF; level 2B).
- TTh in hypogonadal men (total T level < 12 nmol/L) is associated with significant increases in self-reported measurements of EF that are proportional to the severity of hypogonadal status before treatment (level 1A).
- Basal and longitudinal assessments of T are recommended in men with erectile dysfunction (ED; level 1A).

Recommendation 8
- DHT exerts qualitatively similar effects as T on EF (level 2A), although it has been studied less extensively.
- Treatment with DHT and its analogs (mesterolone) cannot be recommended as an alternative to TTh to improve EF in hypogonadal men (level 4B).
- Measurement of DHT is not recommended in the assessment of EF (level 3A).

Recommendation 9
- The role of E2 on EF is controversial. Experimental evidence indicates that E2 downregulates phosphodiesterase type 5 (PDE5) expression (level 3C).
- Measurement of estrogens is not recommended in the assessment of EF (level 2C).

Recommendation 10
- DHEA and DHEAS are not involved in the regulation of male EF (level 2A).
- Glucocorticoid and mineralocorticoid in adrenal insufficiency might play a role in restoring EF (level 4C).

Recommendation 11
- PRL does not play a direct role in the regulation of male EF (level 3B).
- PRL evaluation is not recommended in patients complaining of ED (level 2B).
- Treating hyperprolactinemia might have indirect, positive effects on arousal and erection (level 3B)