

## The Psychopharmacology of Sex, Part 1

### Neurotransmitters and the 3 Phases of the Human Sexual Response

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**Issue:** *The human sexual response has various phases, each with a unique psychopharmacology that can be influenced by different hormones, drugs, and diseases.*

**T**he human sexual response is an often overlooked dimension of psychiatric disorders and is an important consideration in treatment with psychotropic drugs, especially antidepressants.<sup>1,2</sup> Clinicians as well as the literature tend to think of “sexual dysfunction” in a global sense rather than in terms of “sexual phase dysfunction” with unique neuropharmacologic mechanisms, unique impacts of disease on each phase, and in particular, unique actions of various drugs on the various phases of the sexual response. Here, we review a simplified formulation of the neuropharmacology of the normal human sexual response. Next month, we will review the actions of various drugs and diseases upon the normal human sexual response, not in global terms, but according to effects on each of the phases of sexual functioning.

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#### Take-Home Points

- ◆ The initial phase of the human sexual response is libido, or desire, linked to satisfaction with sex, prominently controlled by dopamine.
- ◆ Next comes arousal of genital tissues, resulting in erections in men and genital lubrication and swelling in women, controlled by acetylcholine and nitric oxide.
- ◆ Finally, orgasm, accompanied by ejaculation in men, is regulated by serotonin and norepinephrine.

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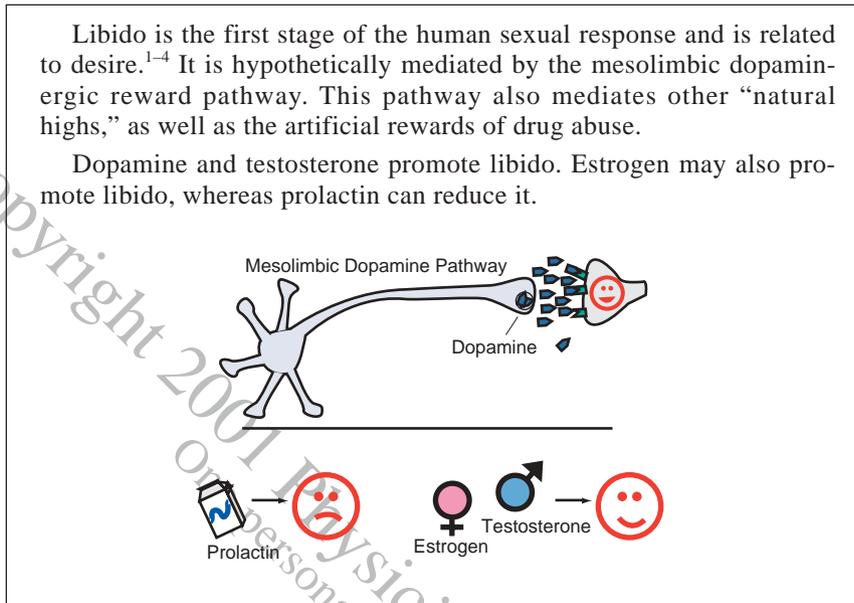
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Stage 1: Libido

Libido is the first stage of the human sexual response and is related to desire.<sup>1-4</sup> It is hypothetically mediated by the mesolimbic dopaminergic reward pathway. This pathway also mediates other “natural highs,” as well as the artificial rewards of drug abuse.

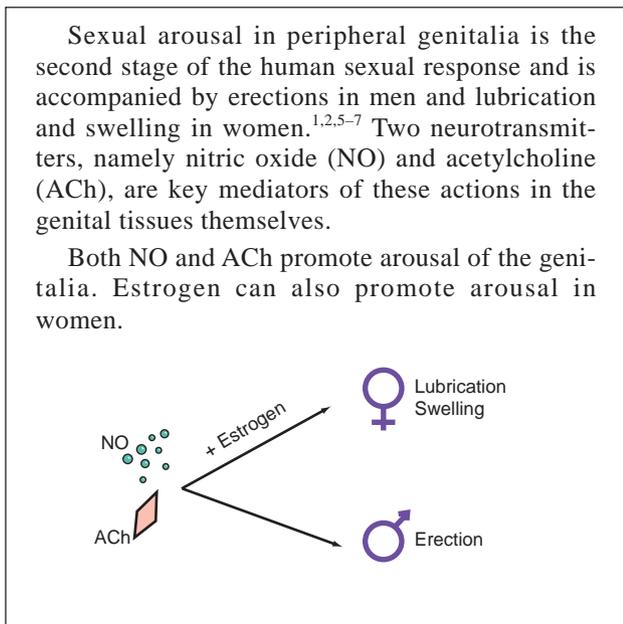
Dopamine and testosterone promote libido. Estrogen may also promote libido, whereas prolactin can reduce it.



Stage 2: Sexual Arousal

Sexual arousal in peripheral genitalia is the second stage of the human sexual response and is accompanied by erections in men and lubrication and swelling in women.<sup>1,2,5-7</sup> Two neurotransmitters, namely nitric oxide (NO) and acetylcholine (ACh), are key mediators of these actions in the genital tissues themselves.

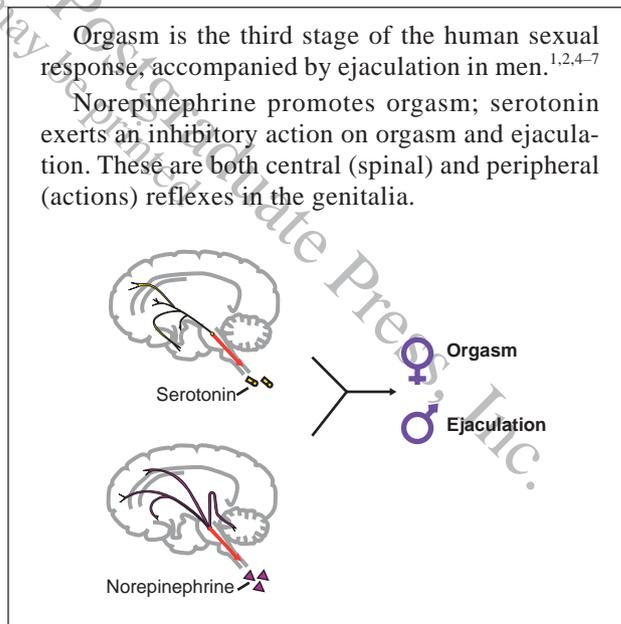
Both NO and ACh promote arousal of the genitalia. Estrogen can also promote arousal in women.



Stage 3: Orgasm

Orgasm is the third stage of the human sexual response, accompanied by ejaculation in men.<sup>1,2,4-7</sup>

Norepinephrine promotes orgasm; serotonin exerts an inhibitory action on orgasm and ejaculation. These are both central (spinal) and peripheral (actions) reflexes in the genitalia.



Next month

How Psychotropic Drugs Promote and Interfere With the Human Sexual Response