

Neurophysiology of Female Sexuality ^{1*}George Thomas

¹Rajiv Gandhi Centre for Biotechnology,
Thiruvananthapuram, Kerala, India.

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***Corresponding author:** G. Thomas

The Brain Functioning

George Thomas

Neurons are the basic unit of nervous system. These highly specialized cells have a multitude of terminals which provide intricate anatomical connections that allow complex functional relationships. Neurons generate, receive and transmit impulses to other neurons across connections by means of micro-release of neuro transmitter substances. The nervous system is a network of neurons organized into special reflex centers, serving different functions. The brain consists of many such reflex centers and circuits that comprise large clusters interconnecting neurons.

Reflex arc is the basic unit of nervous organization which have afferent (carrying into) and afferent (carrying out) nerves. Efferent neurons convey impulses to muscles or glands to contract or secrete. Reflexes have a sensory and motor component. It is comparable to a door bell in which the sensory component is the switch while its motor expression is the ringing bell. In humans the clitoris is the sensory organ, its motor expression is felt in the contractions of the vagina.

The brain have an advanced upper center and a primitive lower center. Upper center is a late evolutionary development along with the mammalian transformation. Most of the lower centers are located in the spinal cord. It is called reptilean brain because during this stage no higher centers were evolved to process raw impulses, reflexes were passed directly to the motor muscles.

The higher system was evolved with highly specialized functions like storing memories and reproducing them, differentiating virtue from evil etc. Evolution of thalamus, hypothalamus, the limbic system with its cortex which mediates reasoning and social judgements were important developments. The central nervous system elaborated higher integrative centers dominating the original ones. But it never discarded some of its primitive structures. Thus reflexes for erection and ejaculation in male and vaginal lubrication and orgasm in female were retained in the primitive lower center, the sacral segments of the vertebrae numbers S2 S3 and S4.

Genital impulses from primitive regions are wild and irrational, they are in normal case involuntary and cannot be controlled

✉ gtktvla@gmail.com

Rajiv Gandhi Centre for Biotechnology,
Thiruvananthapuram, Kerala, India

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by the will of a person. But reflexes from higher centers interact with these wild impulses and block, alter or bifurcate them. Some of these impulse are psychologic, some neurophysiologic. Along with the sensory impulses from genital stimulations there are inhibitory and facilitative impulses from hypothalamic, thalamic and limbic centers which in turn are influenced by inputs from stored memories, and experiences, learned hierarchies and from ongoing emotional states.

Women for centuries were propagated as thoroughly predisposed to inhibitive reflexes. They were, as a whole, branded as frigid and psychologically wrecks because of their inability to atone their orgasmic release coterminus with male ejaculation. Masters and Johnsons¹ researches revealed that it is not the female, but the male's inability to attenuate his ejaculatory threshold that betray the sexes to reach joint climax in heterosexual coition. They pointed out a phsyiological factor as a root cause of disharmony in partnered sex.

However, the lower reflex mechanism have been understood for sometime while the cerebral localizations are still debated.

The Internal Network

Internal sensual spots for women are located in the pelvis. Pelvic area involves the clitoris, vagina uterus, cervix and the pelvic floor muscles. Clitoris and vagina are enmeshed with these muscles striped like 8. They are rich in nerve endings causing pleasurable sensations so that contracting and releasing them produce sexual arousal.

Clitoris is the most important sensual organ in the female genital geography, the sensory component of orgasm which transfers sensual stimuli to the vagina where the motor expression is felt with its contractions. The tiny clitoral glans alone have about 8000 sensory nerve endings which are highly sensitive to touch. The receptor density of clitoral tissues, are fourteen times higher than the penile tissues, reports Natali Angier².

The pelvic nerve in human female branches out of the sacral vertebrae in the lower back. From there it branches again into three far reaching neural pathways that extend throughout the pelvis: One originating in the clitoris, one in the walls of vagina, one in the cervix. Another network originate along the perineum (area between anus and perineum) and anus.

Vagina is less responsive to touch sensitive nerves, but deeper inside the organ is embedded with pressure sensitive nerves.; that is why women demand deep thrusting during coition. But the lower third of the vagina have touch sensitive nerves, it becomes edematous³ and vasocongested⁴ with blood during excitation. That portion of the labia hanging around the vaginal orifice are sensitive to stimulation, they become readily engorged with blood. It means that they might have evolved many of the special nerve endings which convey the sensation of sexual excitement.

For some women a lot of neural pathways originate in the clitoris and their vagina are less dense with nerves. Such women prefer solely clitoral stimulation, they get nothing much from vaginal penetration. For some others just the reverse is the case, a third group whose sensitive spots appear closer to the surface makes the partner's task easy. Women with deeper placement of such spots make the partner task cumbersome.

Skin Eroticism and External Response

Touch, taste, vision, smell and such other sensations are biologic features. Systematic study of sensations and perceptions enable us to understand the way in which the nerve system is networked to be sensitive to specific kinds of stimuli. Our bodies contain afferent and efferent nerve cells that are sensitive to stimulations. Temperature nerve cells just beneath the skin have nerve endings sensitive to heat or cold. They react to changes in weather and convey signals or reflexes to the central nerve system which in turn urge the organism to seek immediate shelter.

Women have a highly varied and vast network of touch sensitive nerves externally. It is an evolutionary heritage in the sense that during the quadruped stage of our evolution it was the olfactory (smell) perception that attracted the sexes to copulate. Smelling, mutual body rubbing, caressing etc, were erotic expressions of animal love. As our ancestors began to walk on hind legs the eye became a major erotic organ, the olfactory role in animal eroticism was replaced by visual perceptions. While the primate male forsake smell, body contact and such other love procedures the female retained some of them and developed it in her evolutionary march.

As a result the higher species, particularly the human female developed a vast array of touch sensitive nerves not only in

her genitals but dispersed vicariously throughout her body. Other than the genitals researchers have located 42 such spots in her body. Ear lobes, lips, the clavicle, armpits, nipples, lower abdomen, pubic mount, hands buttocks, thighs and legs etc, are highly sensuous spots. If we include fetish objects her kerchief, garter, shoes and her leather bag breath life.

Women have an aversion for raw sex defined as erection, penetration and ejaculation. She wants to be touched, rubbed, caressed, cuddled, pinched etc. The more a woman is touched. The more she becomes attached and the more she needs to be touched and the cycle goes and goes around in mythical pattern. How an accidental touch of an ungloved male finger with the naked arm of a chaste and highly orthodox young -woman is portrayed by Tolstoy in Death of Ivan Illych. Mahsa the 21 year old Russian beauty with two children suffering from her atrocious marriage bonds with a man double her age was so much swept away by this touch of an young Italian Marquis that she thought: "I am unhappy already. Why not sin and shame overwhelm me still further". Her husband and child once precious to her passed away from her life.

It is because of this touch and mutual body rubbing nostalgia that women are drawn to lesbian sex. Even after the most satisfying orgasm women generally crave to be touched and caressed.

Touching and rubbing is a basic animal instinct. They select cavities and caverns in rock formations not only to hide but to rub against too. A touch can calm a crying child, touching causes certain glands to excrete a chemical called endorphins, a natural opiate the body produces to protect the organism from pain. When a mother holds her baby its endorphin levels soar making it glow with contentment. Endorphin is a minor player in the drama, recent researches found out, it is oxytocin, a correlates of estrogen, the basic females hormone, the major ingredient. Women are more responsive to touching and bonding because of this estrogen -oxytocin tie up. Estrogen accelerates the production of oxytocin and a woman is awash with oxytocin the more she is touched.

Oxytocin is a peptide⁵ produced by the posterior lobe of the pituitary. Its primary function is to promote touching and bonding. It paces with another hormone dopamine, the basic endocrine that promotes bonding and addiction. While oxytocin level hikes dopamine plummets and vice versa. Dopamine addiction quality also include attachment. When the qualities of these two endocrines are clubbed we get the phenomenon of human attachments and pair bonding the platform from where monogamy and single spouse family system sprang up.

Mytonia

Muscular spasms and contortions of tissues is another major external feature of female sexual expression. Vasocongestion that develops in her nongenital external tissues and muscles is resolved by recurring contractions of muscles. Despite the generally superior muscular development of the human male, women have a spatially, anatomically and pshysiologically a much larger sex linked musculature.

As excitation progress, a female's arms and legs become spastic. In the male on top position a woman lies flat with outstretched arms and legs, a fertile positioning for mytonic current to pass. As a woman reach preorgasmic plateau phase, she is swept through from forehead to toe with mytonic current. She frowns, scrawls or grimaces as facial muscles contract, the mouth may open voluntarily in a gasping reaction. The jaws are clenched spastically, abdominal muscles voluntarily contract to facilitate forceful thrusts of her partner.

Some women voluntarily contract buttocks and gluteal muscles to elevate sexual tension. Legs and thighs may voluntarily part to accommodate penis but as tension heightens to plateau level, thigh muscles begin to tighten and constrict to elevate pleasure. With orgasm, thigh reaction becomes involuntary. Arms of female put pup sexual demands, she may try to hold male shoulders or upper arm of the male. It may turn out into an involuntary clutching or grasping reaction.

Severity of a woman's sexual response may be gauged by her perspiratory output. She is awash with sweat over her whole body sites in the postorgasmic period. Some women experience a kind of trance during orgasm. Muscle strain from severe spastic contractions may not be felt during high ecstasy periods but the next day she feel aching of arms, legs, abdomen and buttocks muscles.

Breasts

Breasts and mons pubis are two other external organs of high responsivity after clitoris. There are many instances of woman achieving orgasm by breast stimulation alone. It is not only the nipples, but the areola too are areas of high sensous nerve concentration. When aroused its distension is such that the nipples totally disappear. A well stimulated breast may register an increase of 0.5cm-1cm in length and 0.25-0.5 in diameter during arousal.

As tension develops rashes appear on the anterior, lateral and interior surface of the breasts. It spread over to the shoulders, armpits and abdomen. With orgasm this may extend to anterior and lateral boarders of thighs, buttocks and the entire back. These reactions are indications of the sexual tension experienced by a woman.

Mons pubis is the curved slope in the lower abdomen in front of the vaginal opening. It is full of pressure sensitive nerves. Gentle stroking of the organ effects pleasurable sensations. During coition contact between the male and female pubis facilitate orgasm. As excitations progress the erect clitoris retract to the anterior walls of the pubic symphysis which is just below the mons pubis thus causing indirect stimulation to the clitoris. As a woman reaches preorgasmic stage, pubic mons stimulations are sufficient to effect orgasm without penile intervention.

Incompatible Sexes

"I think one would have to deal with the possibility that there is something in the nature of the sexual drive itself that is unfavourable to the achievement of complete satisfaction" - Sigmund Freud.

Orgasm is a simple neurophysiologic process. Heightened sexual tension causes extraordinary supply of blood in genitals. At a certain point in this buildup a reflex sets in causing concerned organs to contract violently expelling blood trapped in muscles and nerves, which is experienced as orgasm or ejaculation.

For the male, arousal and erection is a simple process; visual cues fantasies or a stare can arouse him. He needs no body contact. His pelvic network includes very regular; schematised grid of neural pathways, a circle of pleasure around the penis. His arousal, erection and ejaculation are over within four minutes. Once he ejaculates it is impossible to reactivate him to another love act after a considerable lapse of time.

Women on the contrary have a much more extensive and sophisticated genital organization. She have two genitals the clitoris and vagina which needs highly skilled manoeuvres to satisfy. Apart from genitals, the woman have innumerable sensuous spots externally for which there is no parallel in a male. Anatomic placement and physiologic functioning of the clitoris offers further difficulties. The clitoris during stimulation retracts against the anterior walls of the pubic syphasis from its original pudendal overhang positioning. As the stimulation is withdrawn the organ resumes its flaccid position. The clitoral body's retraction-retrieval sequence which develops recurringly during preorgasmic phase rules out any possibility of sustained clitoral-penile contact.

However, Masters and Johnson concedes that because of the embryonic connection between the labia minora and the clitoral hood or prepuce, synchronized, vaginal thrusting can push the prepuce up and down over the clitoral shaft and glans effecting indirect tactile stimulation.

Because of her extensive distribution of sensuous spots, a woman needs at least four minutes to get just aroused. She needs another ten minutes to reach her orgasmic phase provided the stimulations are not disrupted. It means that the male partner needs to maintain the penile-vaginal containment with thrusting for fifteen minutes. A healthy normal male is incapable for such a permance.

No woman is satisfied with one orgasm. She is capable of sequential orgasm; her first orgasm is weak and not enthralling. She has the potential to five sequential orgasms in one bout. The more a woman have orgasms the more she becomes energized for another bout.

All things considered it means that women are designed to receive pleasure and orgasm from skillful caressing and rhythmic pressure of all kinds over many many parts of her body. Pornographic model or conventional sex patterns stimulating one or two areas of her body cannot satiate her. While the male sexuality is genitally oriented female sexuality is total body responsive.

In conventional sex the male ejaculates in four minutes, retires and sleep while the sexually frustrated woman relieves herself by masturbating beside her sleeping husband.