

Histological Studies of Progesterone Treated Vagina of Albino Rat (Wistar strain)

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Abstract

Progesterone is a major steroid secreted by the corpus luteum. The vagina is a fibromuscular tube which forms the opening of the female reproductive tract. Present studies revealed the effect of progesterone on tissues of vagina. Intravaginal micronised progesterone is more effective than intramuscular progesterone in improving the implantation rate and decreasing the incidence of abortions. The vaginal epithelium seems to react more swiftly to the progestin than the endometrium.

KEYWORDS: Progesterone, vagina, endometrium, corpus luteum.

INTRODUCTION :

Progesterone is a major steroid secreted by the corpus luteum. In 1934, Butenandt, isolated this progestationally active substance (Butenandt and Westphal, 1934). The bioavailability of oral progesterone has been estimated to be approximately 25% based on the a comparison of the daily production rate of endogenous progesterone and the dose required to produce physiological plasma concentrations. (Whitehead et al. 1980). It is due to such low oral bioavailability that progesterone is usually administered by intramuscular injections, or as a rectal or vaginal suppositories.

Incidentally, intravaginal micronised progesterone is more effective than intramuscular progesterone in improving the implantation rate and in decreasing the incidence of abortions (Smitz et al. 1992).

During the last two decades, there has been a significant progress in the studies of hormonal contraceptives (Natural and Synthetic), such as Progesterone and their effects on the specific target organs. Graham et al. (1997) studied the physiological action of progesterone in target organ. Present studies revealed the effect of progesterone on tissues of vagina. Lee (1968) studied contraceptive and endometrial effects of medroxyprogesterone acetate, he commented that ovulation was inhibited for prolonged periods after a single injection.

Drug Chemistry

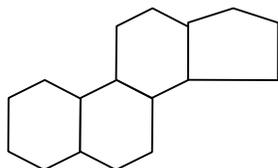
Progesterone is a major steroid secreted by the corpus luteum. Progesterone exists as colourless crystals or yellow-white odourless, tasteless powder. It is prepared commercially from diosgenin or stigmasterol, which are obtained from plant sources.

Chemistry

21 30 2

Progesterone (C H O)

Pregn -4 -ene - 3 ,20 - dione.



Molecular weight = 314.5

Solubility

In alcohol - 1 in 8

In water - 1 in 10,000)

MATERIALS AND METHODS

ANIMALS:

Young, healthy, sexually mature female albino rats of Wistar strain (120-150 gms body weight) with normal reproductive history were procured from Haffkine Biofarmaceuticals. The animals were kept under uncontrolled room ambient temperature and photoperiod . Food pellets marketed by Lipton India Limited and water provided **ad libitum**. The rats were acclimatized for a month to the laboratory conditions prior to the commencement of any experiment .

The animals were divided into control and experimental groups, female Rats belonging closely to a certain weight group were selected , the reason for which all the groups of Rats at the commencement of the treatment did not weigh the same. The treatment lasted for 24 weeks duration i.e 24 injection of i.m.injectable progesterone of 100% purity which is available in the market with same trade name.

On the completion of the treatment period, the animals were weighed and sacrificed under light ether anaesthesia. The **vagina** was quickly excised cleared off the adhering fat blotted and weighed after which processed for the various light microscopic studies.

RESULT AND DISCUSSION

CONTROL RAT VAGINA :

The vagina is a fibromuscular tube which forms the opening of the female reproductive tract. The wall of vagina consists of three layers, a mucosa membrane, a muscularis layer and outer adventia .

The mucus membrane, in turn consists of stratified squamous epithelium and an underlying connective tissue (fig.1&2). Connective tissue papillae project into the under surface of the epithelium, giving epithelial connective tissue junction an uneven appearance. Epithelial cells contains darkly stained , centrally located nuclei (figs.1 &2).

Muscularis is also known as lamina propria . It is made up of more dense connective tissue near the epithelium but becomes more loosely knit towards the muscularis. (figs.1&2).

PROGESTERONE TREATED VAGINA:

The vaginal epithelium seems to react more swiftly to the progestin than the endometrium. Vagina shows undulation of lining (fig.3). Epithelium is papillated and shows thickened squamous epithelial cells compared to the control specimen . Stratified squamous epithelial cells are ladden more towards the basal region and rest on the surface of the lamina propria . Lamina propria contains partly keratinized cells(fig. 3). The epithelial nuclei are prominent at the basal portion of the cell . The stroma is relatively loose and edema is absent. No change is observed in leucocytes and venous channels (fig.3).

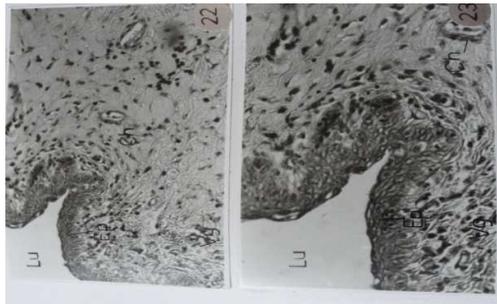


Fig.1 &2- Micrograph of untreated rat vagina showing part of vaginal lumen(Lu), papillated epithelium

epithelium (Ep), and venous channel (Ch). epithelium (Ep), and venous channel (Ch). layer (Ms).

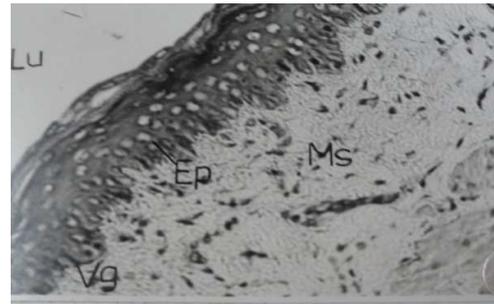


Fig. 3- Rat vagina after progesterone treatment.

The micrograph showing (Ep), covered with mucus layer (Ms).

The vagina is a fibromuscular tube that connects the uterus with the exterior of the body and serves as a copulatory receptacle and birth canal. In the present study vaginal epithelium after progesterone treatment showed papillated cells and thickened squamous epithelium. Maqueo et al. (1964) studied human vagina and revealed that the vaginal epithelium responded more promptly after treatment with progestin knowing the fact that the vaginal cells are more sensitive to hormonal stimuli than endometrium, a more consistent and intense response to progestational stimuli was found in the vaginal cytology.

Most studies of cyclical changes in the vagina have focused on the epithelium. At present, little is known about changes in the lamina propria or muscularis in either humans or animal models in response to hormonal insufficiency to warrant the drawing of any conclusions or formulation of hypotheses (Monica et. al 2013)

a comprehensive study of vaginal morphology and innervation as related to hormone deprivation and administration is necessary to provide a baseline for new hypotheses regarding the role of sex steroids in maintaining the structure and functional integrity of the vagina. (Monica et. al 2013). Present experimental work emphasized on histomorphic changes of rat vagina after progesterone treatment.

REFERENCES

1. Bavelander G. (1970). Essentials of histology. **Eds. 6. St. louis. The c.v. Mosby Co.(1970)**
2. Bourgos M.H. and Wislocki G.W. (1950). The cyclical changes in the mucosa of the guinea pigs uterus, cervix, and vagina in the sexual skin investigated by the electron microscopy. **Endocrin. (1950) 63: 106 - 21.**
3. Butenandt and Westphal (1934). Zur Isolierung and charakterisierung des corpus luteum Hormones. Berl. Btsch. Chem. Ges.(1934); 67: 1440.
4. Elder M.G. (1984). Injectable contraception clinics in : **Obstetrics. and Gynecology 1984) Vol. II No. 3.**
5. J.Dinny Graham and Christine Clarke (1997). The physiological action of progesterone in target tissues. **Endocrine Review 1997); vol. 8(4): 502-518.**
6. Lee (1968). Histochemistry of normal and abnormal endometrium. **Am. J. Obstet. and Gynecol. (1968); Vol. 104: 130 -133.**
7. Maqueo et al. (1964). Endometrial histology and vaginal cytology during oral contraception with sequential estrogen and progestin. **Am. J. Obstet. and Gynecol. (1964); 90: No. 3.**
8. Monica et.al (2013) Differential Effects of Estradiol, Progesterone, and Testosterone on Vaginal Structural Integrity . **Endocrinology, Vol. 147, Issue 1 published on line 1jul. 2013**
9. Smitz J. Devrocy, P. Faquer, B., Bourgain, C. Camus, M. and Steirteghen, A.C. (1992). A prospective randomized comparison of intramuscular or intravaginal natural progesterone as a luteal phase and early pregnancy supplement. **Hum. Reprod. ; 7(2): 68 - 75.**
10. Whitehead M.I., Townsend, PT. Gill D.K. Collins W.P. and Campbell, S. (1980). Absorption and metabolism of oral progesterone. **Br. Med. J.(1980); 280: 825 827.**