Hormonal Cytology

14° Team
Assessment of hormonal cytology

The smear samples the surface of the epithelium.

Estrogen ensures that the uppermost layers of the epithelium are mature: that is consisting of large polygonal flat, eosinophilic cells with a pyknotic nucleus (superficial cells).

Progesterone impedes the normal maturation of the squamous epithelium resulting in a predominance of intermediate cells on the smear.
Cytologic findings

- The general pattern of the smear depends on the level of gonads hormones, on the vaginal microbiologic factors and it varies with age.
At birth

- Gonadal hormones are produced in a large amount during pregnancy and pass through the placenta into the fetal circulation. The squamous epithelium of the cervix and of the vagina of a newborn girl responds to this strong hormonal stimulation.

- A smear, obtaining with a thin cotton applicator, contain a clear predominance of superficial cells.
After a few days after birth the maternal hormones are eliminated:

The smears contain mostly **parabasal cells**, reflecting the absence of gonadal hormones.
At puberty

- Even before the first menstrual period occur, the vaginal smear begins to change; *intermediate cells* replace the parabasal cells and a few *superficial cells* reflect the onset of estrogen production in the ovaries.
Intermediate and superficial cells
During the Reproductive year

- Day 1 of the cycle is the first day of menstruation. The first 5 days are characterized by a smear containing blood, cellular debris, inflammatory cells, endometrial glandular and stromal cells.

- From 5 to 10 day, the smear usually contains a predominance of intermediate squamous cells. The cells may occur in clusters but are mostly isolated.
A cluster of endometrial glandular cells observed on a 7 day of menstrual cycle.
Days 11 to 15 comprise the ovulatory phase, characterized by very clean smear with many superficial squamous cells. Just before, or at the time of ovulation, the endocervical mucus is abundant and when is spread on a glass slide will reveal a special fernlike crystallization.

The secretory phase begins around day 16 of the cycle. The predominant cell is the intermediate cell which contains a large amount of glycogen.
Day 11 of menstrual cycle. The smear contains a mixture of intermediate and superficial cells.
Mid-cycle smear superficial cells
Mild cycle, fernlike structure.
At the end of the cycle leukocytes and histiocytes in varying number may be seen.

The predominant cell are of intermediate type with a few scattered superficial cells.
Luteal phase intermediate cells
During pregnancy

- Vaginal smears reflect the balance of hormones during pregnancy.
- Generally the high level of progesterone do not allow the complete maturation of the squamous epithelium.
During pregnancy

- The pregnancy smear has two characteristic features:
- 1) the presence of numerous “navicular cells” so called by Papanicolaou because of their shape.
- These small intermediate cells contain a large amount of glycogen, which pushes the cytoplasm out to the periphery where it becomes dense and cyanophilic, the nucleus is eccentrically located.
- 2) and a marked cytolysis related to the abundance of lactobacilli.
Cytolysis Doderlein lactobacilli
Menopause is generally defined as the cessation of menses.

The smear consists mostly of parabasal cells.

“Blue blobs” are sometimes noted, these being interpreted by some as mucin by others as degenerate cells.
Menopausal smear: parabasal cells and naked nuclei.
Atrophic smear
The end