

# ELECTRONOMICROSCOPIC DATA ON GINGIVAL MUCOSA IN WOMEN IN RELATION TO OVARIAN CYCLE

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**Abstract:** *The structural behavior of cyclic gingival mucosa of woman, in relation to ovarian cycle, was studied at the electronic microscope. Obtained results are less spectacular, at least for the follicular hormone phases, for the time of ovulation and the start and medium estro-progesteronic phases. They become more evident in the final estro-progesteronic phase and the hemorrhagic phase.*

**Key words:** *gingival mucosa, ovarian cycle.*

## 1. Introduction

The action of ovarian steroid hormones, reflected along functional uterine cycle in vaginal epithelium, allowed the study of these cells on glass slides [1]. The review has become a method in current gynecologic practice [3]. Hormonal vaginal cytodagnosis can give an accurate assessment of cellular structures (nucleus-cytoplasm), for desquamated cells from the surface of the vaginal epithelium, as well as for elements which can be found in the spaces between these cells such as the formed elements of blood, conjunctive cells, parasites, bacterial flora [2], [4].

Besides the endometrium, progesterone's and estrogen's actions have been reported in skin and nasal mucosa [6], [7], but these only in terms of vascular changes [5].

Female oral mucosa, however, has not been mentioned with such changes or any other type, for which this work aims to follow on electronic microscope the action of ovarian steroid hormones on gingival epithelium.

## 2. Method and Material

Using the electronic microscope fragments of oral mucosa were studied. These were collected from the specialized services for women between 20-40 years in relation with proliferate phase (estrogen), secretory (estro-progesteronic) and menstrual of the normal ovarian cycle and (cycle average - 28 days).

The collected fragments were processed according to the following techniques:

1. Fixation with cacodylate buffered glutaraldehyde, 90 minutes at a temperature of 4 degrees Celsius.
2. Washing with cacodylate buffer pH 7,4 3 times for 5 minutes at a temperature of 4 degrees Celsius.
3. Gömöri environment incubation (Gömöri 1952).
4. Postfixation in osmium tetroxide for 90 minutes at 4 degrees Celsius.
5. Rinsing in bi-distillated water 3 times for 5 minutes at room temperature.

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6. Staining in block with uranyl acetate for 30 minutes at a temperature of 4 degrees Celsius in the dark.
7. Wash with 10% alcohol, 2 times for 3 minutes at room temperature
8. Dehydration with 70% etilic alcohol for 5 minutes at room temperature.
9. Dehydration with 90% etilic alcohol for 5 minutes at room temperature.
10. Dehydration with 100% etilic alcohol for 5 minutes at room temperature.
11. Dehydration with propilenoxide, 2 times for 5 minutes at room temperature.
12. PONE penetration and inclusion in propilenoxide (1:1), at least one hour.
13. Propilenoxide evaporation of up to 8 hours.
14. EPONE penetration with inclusion, for 2 hours.
15. Inclusion.
16. Ultra sectioning.
17. Contrasting grills.
18. Examination of scales at electronic microscope increasing from 2600x to 11000x.

### 3. Results

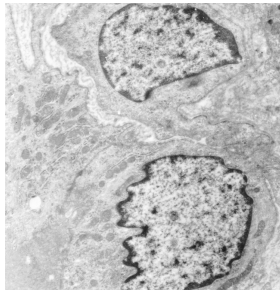


Fig 1. *Woman's gum, estrogen phase (proliferative) ovarian cycle*

Electrono-optical image. Epithelial cells from basal layers united together by GAP junctions. The adherens area and macula adherens. The core with sinuous, irregular shape contains almost exclusively euchromatin and a nucleolus. The very

narrow row of heterochromatin is in the ectonucleoplasm near the nucleolema. Cytoplasm is very rich in all types of cell organelles. The most numerous are mitochondrias in different moments of the cycle (contraction-bloating) and the tube-form endoplasmic, callous reticulate appears highly developed.

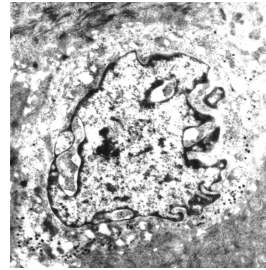


Fig. 2. *Woman's gum, estrogen phase of the ovarian cycle*

Electro-micrography of a Langerhans cells from the epithelial basal layer of gingival mucosa. The large diameter core, contains an abundance of euchromatin and big nucleolus. The nucleolema presents extensions and large invaginations, with different shapes, lengths and thicknesses, giving the nucleus an irregular form. The cytoplasm is abundant, rich in cell organelles. Cell membrane is very close of these basal cells. The cytoplasm contains tonofilaments that can be seen in parallel rows.

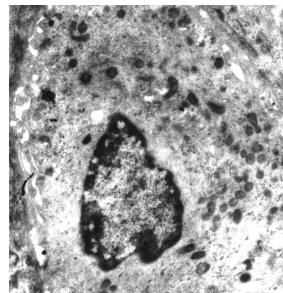


Fig.3. *Woman's gum, estrogen phase of the ovarian cycle*

Electrono-optical image of a Merkel cell from the parabasal spinous layer of the epithelial gingival mucosa. The round-oval core contains mainly euchromatin. The relatively abundant heterochromatin is near the nucleolema, presenting rare and small invaginations. The cell cytoplasm contains mitochondria, granular endoplasmic reticulum, free ribosomes and a great number of generally small granules. The plasmallema sends simple or branched extensions, which interact with similar extensions of nearby cells.

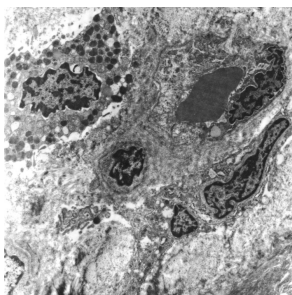


Fig. 4. *Woman's gum, estrogen phase of the ovarian cycle*

Electronic microscope image. Around a blood capillary containing in the lumen a red cell, fibroblasts and a mastocyte are concentrated. The endothelial capillary cell has an elongated nucleus, with irregular edges and reduced cytoplasm. The longitudinally and transversely sectioned fibroblasts have a large nucleus with euchomatin and heterochomatin in approximately equal quantities and each of them a nucleol. The cytoplasm is especially rich in synthesis organelles. The mastocyte has a large nucleus, richer in euchromatin, with sinuous contour. The cytoplasm is loaded with numerous rounded granules of different sizes, scattered in the middle and more numerous towards the pole that is near the capillary.



Fig. 5. *Woman's gum, ovulation phase of the ovarian cycle*

Electrono-optical image of junction epithelium/chorion of gingival mucosa. In the chorion near the basal membrane there is a group of fibroblasts with euchromatic core, nucleolema with folds, showing invagination of different sizes. The nucleus is of irregular shape. The cytoplasm is rich in organite cell. Between the epithelium and chorion the basal membrane can be seen, corrugated, which presents basal lamina (dense lamina), flanked by lucid lamina, which towards the chorion contains fine fibers of reticuline. On the surface of the basal membrane is located an epithelial cell of the generator layer, rich in dark tonofibrils.

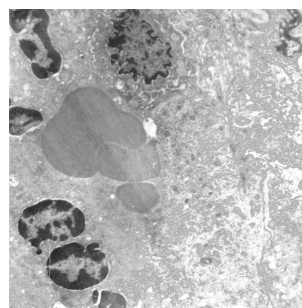


Fig. 6. *Woman's gum in estrogen-progesteric phase of the ovarian cycle*

Electronic microscope image of the chorion's gingival mucosa. There is a blood capillary that contains in the lumen

three red blood cells. In the wall of the vessel is an endothelial cell with large nucleus, rich in euchromatin, with very irregular, sinuous shape. The perinucleolar cistern is clear, slightly enlarged. Cytoplasm with a relatively large number of cell organelles sends a thin extension that borders the capillary lumen. Near it there is, on one side, a nervous fiber, and opposite to it, a group of lymphocytes with characteristic nucleolus, in which heterochromatin is preponderant. It is surrounded by a fine line of cytoplasm.

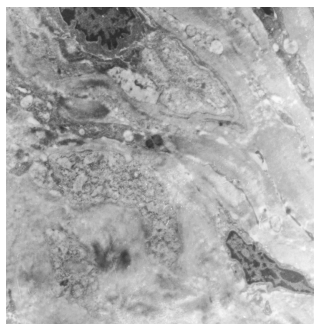


Fig .7. *Woman's gum in the estroprogesteronic phase of the ovarian cycle*

Electronic microscope image of the gingival mucosa chorion in which there are fragments of two fibroblasts with the core, cytoplasmic extensions of other conjunctive cells, cross-sectional myelinic nerve and a rich extracellular matrix. The fibroblasts have different ultra structural aspects related to their functional cycle.

Thus, one fibroblast has a big, euchromatic and heterochromatic core, lesser cytoplasm, with few cell organelles; another cell has large nucleus in which euchromatin is predominant, abundant cytoplasm, rich in cell organelles and inclusions, having a nearby terminal nervous fiber; other fibroblasts have cytoplasm containing large lysosomes and

lipoid drops. There are fundamental substances and rare conjunctive fibers, between cells.

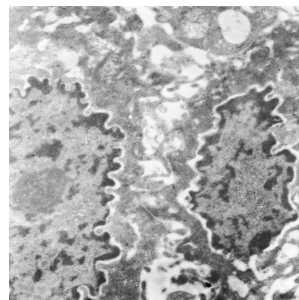


Fig. 8. *Woman's gum in estroprogesteronic phase of the ovarian cycle*

Electrono-optical image of two spinous cells from the epithelium gingival mucosa. The cells are characterized by a large nucleus, elongated, with irregular shapes due to sinuous nucleolema, with different size, repeated protrusions and intrusions existing along its entire contour. In the core there is a large quantity of euchromatin and a big nucleolus. The perinucleolar cistern is clear and expansive, the cytoplasm contains tubes of granular endoplasmic reticulum and mitochondrias. Extensions are present between cells, as well as clear, wider intercellular space.

#### 4. Discussions and Conclusions

On electronic microscopy, in all investigated phases (estrogenic, ovulatory, and estro-progesteronic and hemoragic), epithelial cells of basic layers, spinous profound and medium have ultrastructural characters of activity. Their nucleus is large and eucromatic containing 1-3 nucleols. Nucleolema is always in folds with pronounced invaginations and extensions of various shapes and size and

therefore an irregular nucleus. Perinuclear cisterna is enlarged and clear throughout its circumference.

Generators and spinous cells' cytoplasm is abundant, rich in cell organelle, the most numerous are the synthesis, represented by isolated or arranged in small groups mitochondrias and by granular endoplasmic reticulum in form of tubes. Tonofilaments and tonofibrils are well represented especially when arranged parallel to each other.

Melanocytes and dendritiform Langerhans cells are found between basal cells. Langerhans cells present a large nucleus eucromatic with irregular edges which cause deep invagination of nucleolema. Cytoplasm is rich in cell organelles and Bierbeck granules. The cell sends extensions entering the basal cells.

Merkel cells are found between basal and parabasal spinous cells; they have eucromatic round nucleus with regular margins. Cells cytoplasm contains mitochondrias, granular endoplasmic reticulum and lysosomal granules of different electrono-optical diameters and intensity.

Cells send digitiform extensions that interfere with other cells.

A great number of fibroblasts in different phases of activity are present in chorion, along with macrophages and plasma. The latter ones are increased in number at the end of the estro-progesteronic phase and hemorrhagic phase.

In the estrogen phase, the number of active fibroblasts is well represented. The cells appear crowded with very little conjunctive matrix between them.

In the estro-progesteronic phase, the intercellular matrix grow through quantitative and fundamental substance and through relatively large number of fine fibers of reticulín.

Conjunctive cells appear more distanced, being isolated or arranged in small groups. While in the estrogen phase in small groups of conjunctive cells there are fibroblasts with rare macrophages, in the estro-progesteronic phase cell groups frequently include fibroblasts, macrophages, mastocytes and plastocytes.

In the estro-progesteronic phase, in chorion, around the blood capillaries are often found high quantities of lymphocytes. These lymphocytes, mast cells, macrophages and plasmocytes present in the pre-hemorrhagic phase show that in these moments of ovarian cycle, microphages, macrophages and immunity processes are increased and are held with greater intensity in the gum than in the other cyclical moments. In conclusion, it can be deduced that the ultrastructural changes of the gingival mucosa in women are less spectacular. Changes occur mainly in gingival chorion in the final estro-progesteronic and hemorrhagic phases.

But in addition, electro-optical remarks are worthy of note for the description of Merkel cells and Langerhans dendritiform cells from gingival epithelium, for which information regarding the ultrastructural organization are particularly numerous, complete and totally original, data that is not so precise for the gum in the specialized literature of this field.

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