

# Tissues, Pathology, and Diagnostic Microscopy

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### Expression of GABA receptors in the mouse cervical epithelium during estrous cycle

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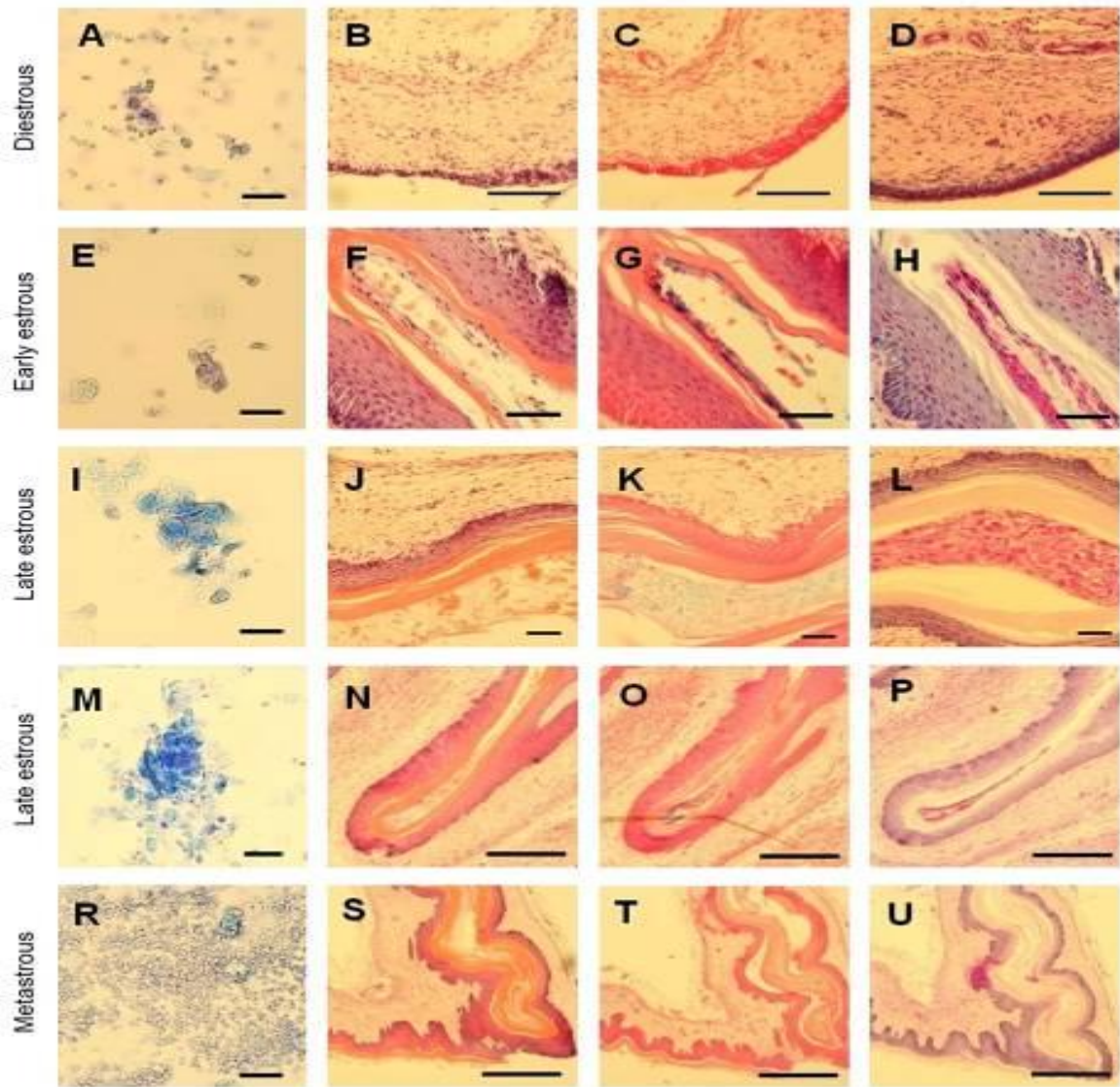
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Cervical mucus has a significant role in female fertility and protection of the reproductive health [1]. The aim of this study was to determine if mouse cervical epithelium with its specific cyclic changes could serve as an experimental model for investigation of the mechanisms and regulation of secretion of the cervical mucus.

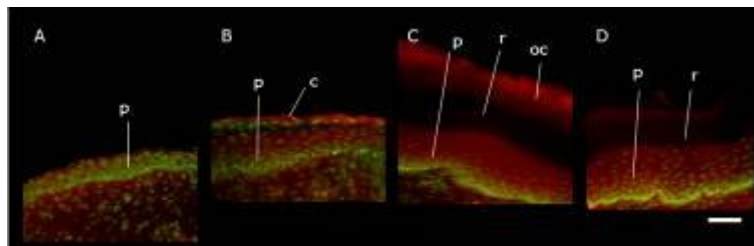
A complete study of the structure and cyclic changes of the mouse cervical mucosa was performed. Additionally, several procedures of collecting samples of vaginal secretions to determine the phases of the ovulatory cycle were tested and the most appropriate method chosen [2].

Cytological and histological analyses showed the correlation between the vaginal secretion and the structural changes in the cervical epithelium and mucus (Figure 1). During the estrous phase of the ovulatory cycle, a simple columnar epithelium appears at the top of the squamous stratified epithelium covering the wall of the cervix [3]. We have shown that this columnar epithelium produces cervical mucus (Figure 1G and 1H). This feature enables the mouse cervical epithelium to serve as a model for investigation of the cervical mucus secretion. Immunohistochemistry and RT-PCR analyses demonstrated the presence of the receptor A of neurotransmitter GABA in the glandular epithelium of the mouse cervix during pro-estrous and estrous phase (Figure 2B and 2C), assuming that GABA plays a role in the cyclic regulation of cervical mucus secretion.

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2. K.R. Pritchett and R. Taft in “The mouse in Biomedical research”, ed. J.G. Fox, (Academic Press, USA) (2007) p. 100-101.
3. B. Peckham and W. Kiekhof, *Am J Obstet Gynecol* 83 (1962), p. 1021-7.
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**Figure 1.** Correlation of the cells from the vaginal secretions and mouse cervix tissue during ovulatory cycle. The cells are stained by methylene blue and eosin (first column), and the tissues by hemalaun and eosin (second column), Astra blue histochemical staining (third column) and PAS histochemical staining (fourth column). Bar A, E, I, M, R - 50  $\mu$ m. Bar B - D - 0,2 mm. Bar F - H, J - L - 0,1 mm. Bar N - P - 0,5 mm. Bar S - U - 1 mm.



**Figure 2.** Expression of the GABA A receptor  $\beta$ 2 in the epithelium of mouse cervix (red immunohistochemical fluorescent signal) during proestrous and estrous phase of the ovulatory cycle. A - diestrous, B - proestrous. C - estrous. D - metaestrous. The green signal shows nuclei stained by DAPI fluorescent staining. p - stratified squamous epithelium, c - simple columnar epithelium, r - cornified layer, oc - epithelial cell remnants. Bar - 0,1 mm.