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HISTOLOGICAL ASSESSMENT OF THE CUTANEOUS APPENDAGE IN GOATS

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Abstract: The aim of the present study was to highlight the architectonics of the cutaneous appendage in goats, harvested from the neck region, from different areas. Although it is well known that the cutaneous appendages, called wattles, are simple extensions covered by skin, with a cartilaginous core, the role they fulfill is controversial and unclear, ranging from no function to beauty, thermoregulation or influencing milk production. The structural assessment was performed using, in addition to the standard staining method - Hematoxylin -Eosin, other histological techniques.

Introduction

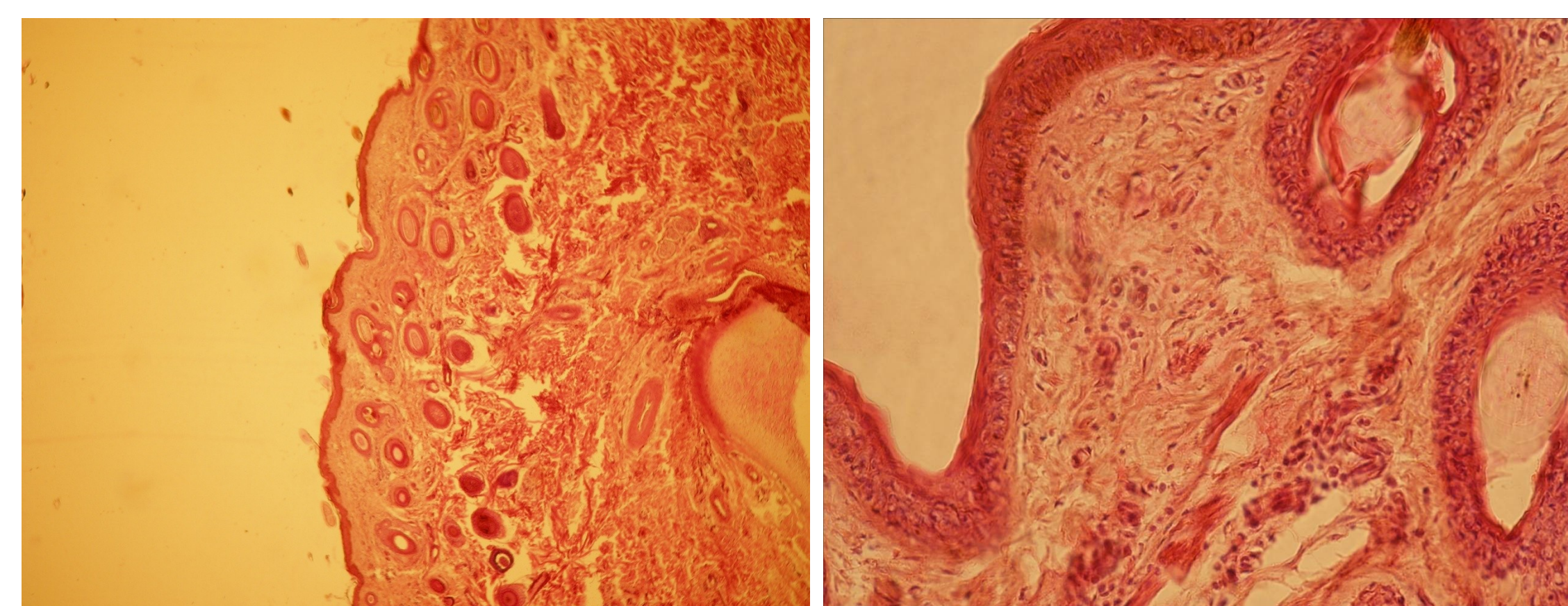
The wattles, appendices colli or tassels, also called "bells" or "skin tag" are a modified structure of the skin with a pearl shape, they can be bi-laterally, unilaterally or absent. Topographically, they will be present between the base of the neck, ventrally or laterally until the caudal portion of the ears. They can be long, short, thin or larger. They will hang from the skin for all their lives. Those appendices can be present in several species, in different regions.

Material and method

This study took place in the summer 2023, with the help of the discipline of Histology and Embryology of the Faculty of Veterinary Medicine of Timisoara. The wattles examined came from the slaughterhouse of Liebling, which were collected with the consent and the help of Dr. Voicu Lucian. The samples were fixed in ethanol 80 volumes for 7 days, after which they were washed, dehydrated and embedded in paraffin. The fixation, as a complex series of chemical events, has the aim to prevent autolysis and bacterial attack, to fix the tissues so they will not change the volume or their shape, leaving the samples as close as their living state as possible. Before embedding in paraffin, the samples were clarified (an intermediate step called clearing) by using two baths of toluene, one hour each. The task of this step is to remove the alcohol from the cells, which is not miscible with paraffin. The paraffin blocks with the tissue fragments included were sectioned using the microtome SLEE Mainz, obtaining continuous ribbons with successive sections of 5 micrometers. Subsequently, one or more sections were carefully separated from the ribbon and transferred to the surface of the slides. The sections thus prepared were processed for the histological study by the usual Hematoxylin - Eosin method.

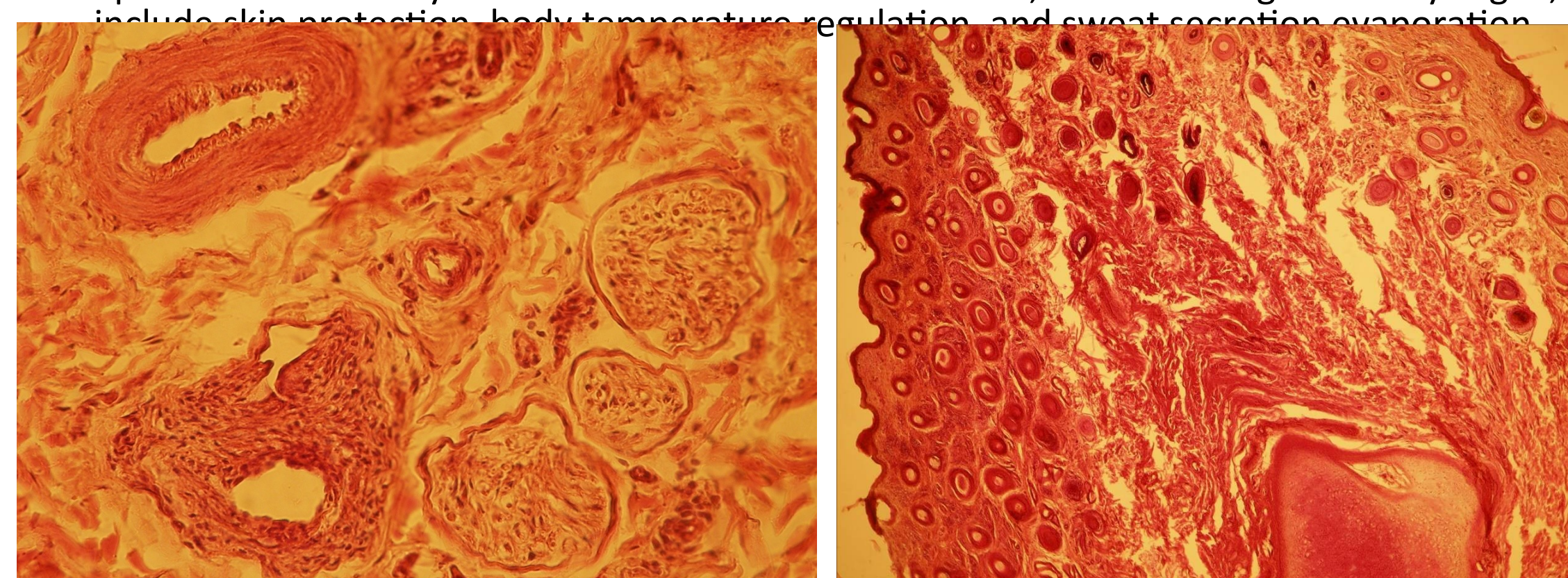
Results and discussions

Microscopic examination of the cutaneous appendix revealed a similar architecture to the skin, with all the anatomical-histological layers being arranged around a cartilage, an aspect also identified in the specialized literature. Thus, from outside to inside, the following structures can be mentioned: epidermis, dermis and subcutaneous layer in which a cartilaginous core is included (Fig. 1). The cutaneous appendix, protected by abundant hairiness, presents a thin epidermis, formed by 3-5 layers of keratinocytes, classically arranged in the 4 well-known layers: basal, spinous, granular and corneous (Fig. 2). Being so thin, the hairy "blanket" is the one that will ensure the protection of the epidermis against stressors (extreme temperatures, ultraviolet radiations, chemicals, toxins, microbial agents: bacteria and fungi).

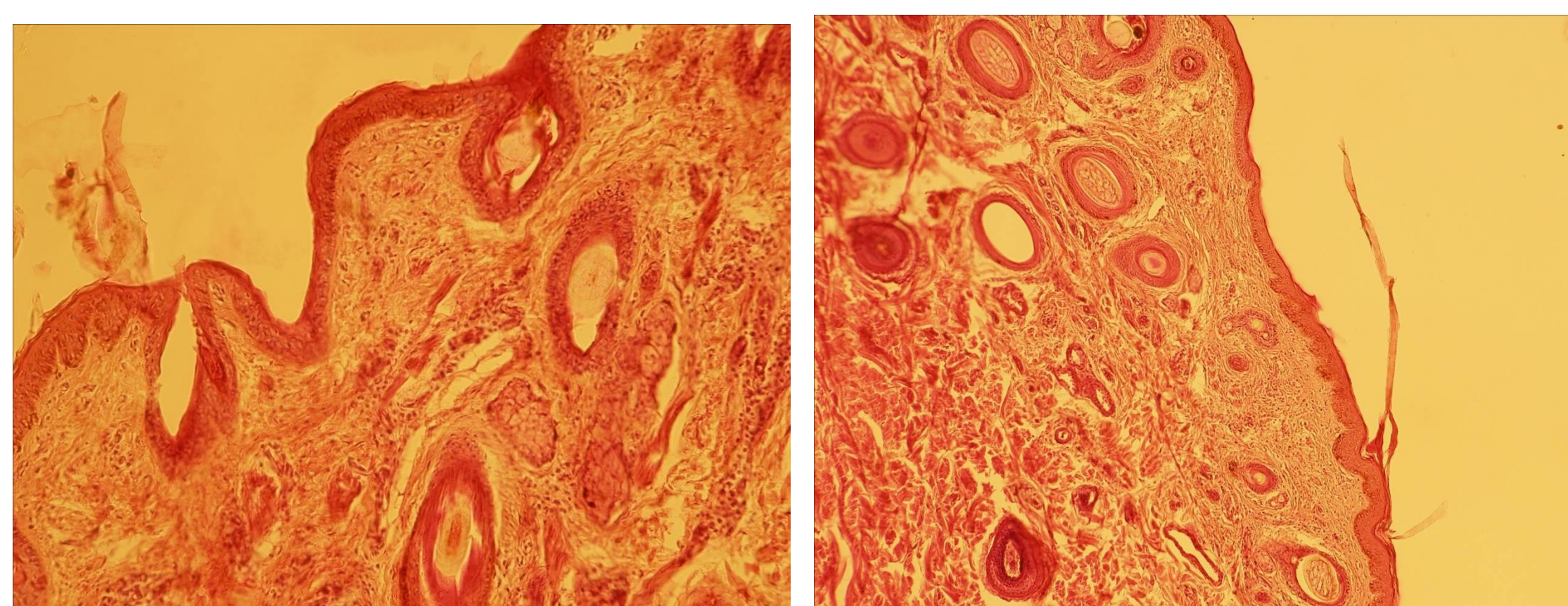


The dermis, a richly vascularized and innervated connective tissue (Fig. 3), contains structures derived from the epidermis, such as hair follicles and sebaceous and sweat glands.

Our histological sections showed an abundant number of hair follicles (Fig. 4). Generally, the hair follicles play a role in the production of hair, contribute to the synthesis of sebum along with the sebaceous gland and represent an important source of stem cells for epidermal keratinocytes. Other functions of hair follicles, besides being a sensory organ, include skin protection, body temperature regulation, and sweat secretion evaporation.



In the wattles, the sebaceous glands, with the classic structure of simple alveoli and holocrine secretion mechanism, without forming lobules, were small in size and were associated with the hair follicles (Fig. 5). Sebum, which has rich lipid content, provides protection against humidity and dryness, elasticity and suppleness to the hair and skin, and also has fungistatic and bacteriostatic effects. Sweat glands, which are tubulo-glomerular glands, are also present in the structure of wattles, in two types: apocrine and merocrine, each of them fulfills different roles (Fig. 6). Since the secretory portion of the sweat glands was not located near any hair follicles, we can say that these glands are associated with them.



Instead of the adipose connective tissue, which constitutes the hypodermis, in the cutaneous appendix there is a cartilage, which according to its architectural appearance is a hyaline cartilage (Fig. 7). Adipose-derived stem cells (ASCs) were first identified as adipose-derived mesenchymal cells in 2001, and since then adipose tissue has been studied as a source of cells for tissue engineering and regenerative medicine. There are several terms for adipose-derived stem cells, for example, preadipocytes, adipose-derived stromal cells, processed lipoaspirate cells, adipose-derived mesenchymal stem cells, adipose-derived adult stem cells, in 2004, the term ASC was agreed upon. In our case, it is possible that the adipocytes that would have formed the hypodermis underwent a metaplasia phenomenon, transforming into cartilaginous cells. In any case, hyaline cartilage is surrounded by a thick, two-layered perichondrium, which provides it with nutrition and growth (Fig. 8).

