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EFFECT OF POTENTILLA ALBA ON THE MORPHOFUNCTIONAL STATE OF THE SKIN UNDER EXPERIMENTAL HYPERTHYROIDISM

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Background

Hyperthyroidism is associated with an acceleration of metabolic processes and may induce significant morphofunctional alterations in the skin and its appendages. Structural remodeling of the epidermal–dermal interface, connective tissue components, and subcutaneous adipose tissue represents an important morphological manifestation of endocrine dysfunction. Therefore, evaluation of the corrective effects of *Potentilla alba* on hyperthyroidism-associated cutaneous alterations using morphological and morphometric parameters is of considerable scientific and practical interest.

Objective

To comprehensively assess morphological and morphometric changes in the skin induced by *Potentilla alba* administration under experimental hyperthyroidism.

Materials and Methods

The study was conducted on white outbred laboratory rats. The histomorphological characteristics of skin tissue were evaluated using standard histological techniques. Morphometric analysis included assessment of epidermal, dermal, and hypodermal thickness, the cellular characteristics of the epidermal layers, the organization and density of collagen fibers in the dermis,



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and fibroblast density. Van Gieson staining was used for morphological assessment of collagen fiber organization and density.

Results

Comparative morphometric analysis of skin samples from 4- and 9-month-old animals in the control group demonstrated distinct age-related structural remodeling of the skin. In 9-month-old rats, epidermal thickness was $15.8 \pm 0.7 \mu\text{m}$, representing a **27.4% increase** compared with 4-month-old animals. An increase in the number of keratinocytes within the basal and spinous layers indicated sustained epidermal cellular activity and preservation of its regenerative potential.

The overall dermal thickness increased from $186.2 \pm 4.3 \mu\text{m}$ in 4-month-old rats to $224.6 \pm 5.1 \mu\text{m}$ in 9-month-old animals, corresponding to an approximately **1.2-fold increase**. Increased density of collagen fibers in both the papillary and reticular dermis, their predominantly parallel orientation, and an increase in fibroblast density to $128 \pm 6.1 \text{ cells/mm}^2$ indicated age-related maturation of the connective tissue and strengthening of the stromal component of the skin.

More intense staining of collagen fibers with Van Gieson staining further confirmed an age-related increase in the density of the dermal fibrous component. In addition, increased hypodermal thickness, enlargement of adipocytes, and more distinct collagenous septa in 9-month-old animals reflected age-associated structural remodeling of the subcutaneous adipose tissue.

Conclusion

Thus, aging in control animals was accompanied by distinct morphological and morphometric remodeling of all major skin compartments, including the epidermis, dermis, and hypodermis. The identified parameters provide a



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morphological baseline for assessing the effects of *Potentilla alba* under experimental hyperthyroidism. Epidermal and dermal thickness, keratinocyte density, collagen fiber architecture, and fibroblast density may serve as informative morphometric markers for objectively evaluating the potential corrective effects of *Potentilla alba* on hyperthyroidism-associated skin alterations.