

Prenatal and postnatal development of tassels in the goat: A histomorphological study

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Tassels are the species specific modification of the skin. These are two cylindrical appendices hanging from the chin region found in some breeds of goat. These are not sex specific and can be present in both males and females. Scanty literature is available regarding the tassel gland in goat. The present work is intended to throw light on histomorphology of prenatal and postnatal development of tassels in goat.

Tassels from fetuses and adult animals (3 each) were collected from both the sides and fixed in neutral buffered formalin. The tissues were processed by acetone benzene schedule. The paraffin sections of 5–7 µm were stained with Hematoxylin and Eosin and Masson's trichrome stains for histomorphological studies (Luna 1968).

Prenatal life: During the prenatal life tassels consisted of a core of cartilage, dermis and epidermis. The cartilaginous core consisted of a well developed perichondrium (Fig.1). Core of cartilage might be for the strength as it hangs externally in the chin region. No cartilaginous core was reported in any of the skin glands of caprine responsible for the buck odour production (Lancker *et al.* 2005). Presence of cartilage has also not been reported in any of the regions of the porcine foetal integument (Mayer and Gorgen 1986). This shows that it consists of features more than that of skin and skin glands.

A distinct dermis was observed between the cartilaginous core and the epidermis (Fig. 2). The dermis consisted of connective tissue containing mainly of collagenous fibres. Large number of blood vessels and nerve fibres could also be observed. Bhayani *et al.* (1992) reported distinct dermis in the skin of buffalo at 74–115 days of gestation comprising mesenchymal cells. Connective tissue of the dermis was interdigitating with the epidermis as the papillary layer.

During the prenatal life the epidermis layer of tassels was lined by a basal layer and 3 to 4 lightly stained superficial

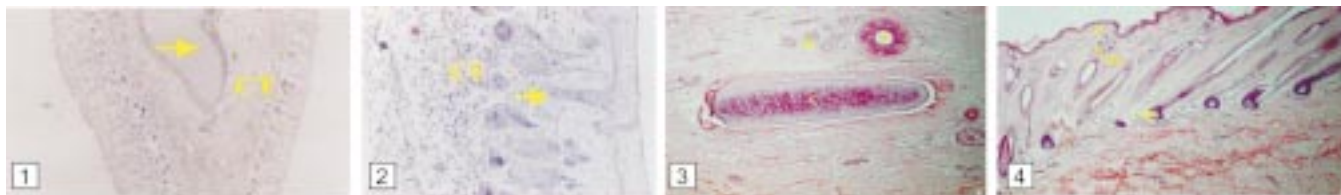
layers. In the epidermis many hair follicles were observed in the form of follicular plug. The formation of follicular plug is induced by the aggregation of mesenchymal cells associated with developing capillaries below epidermis (Maruyama *et al.* 1988). Douqbaq and Berg (1983) reported that the development of the hair follicles started as follicular plugs in the prescapular region of 15 cm-fetuses CRL.

The primordia of sweat gland and sebaceous gland could be observed during the prenatal tassels. Douqbaq and Berg (1983a) reported that the sweat gland primordium appeared as a solid bud from the ental side of the epithelial cords of the growing hair follicles in the 36 cm- CRL fetus from the primary hair follicles and in the 64 cm- CRL fetus from the secondary ones. The development of the sebaceous glands is closely related to hair follicle maturation, i.e. the formation of the first hair canal. Douqbaq and Berg (1983) reported the buds of the sebaceous glands could be observed in the 45 cm-CRL fetus from the primary hair follicles and in the 68 cm-CRL fetus from the secondary ones.

Post natal life: Similar to the prenatal life the tassels during the postnatal life consisted of a core of cartilage, dermis and epidermis (Fig.3). The cartilaginous core consisted of a thin layer of perichondrium. The cartilaginous core was compact and darkly stained as compared to that of prenatal life. The type of cartilage present in cartilaginous core was elastic cartilage.

The dermis consisted of connective tissue with many blood vessels and nerve fibres (Fig. 4). The connective tissue of dermis consisted well developed collagenous fibres. These are indicative of better developed ground substance with respect to the foetal caruncles. Presence of blood vessels and nerve fibres in the tassels signifies it as an active organ but its physiological significance is not clear. Sebaceous glands were numerous in the dermis of tassels. The sebaceous cells which formed the sebaceous gland had lightly stained foamy cytoplasm. The sweat glands were also present in the dermis. Similar observations were made by Panchal *et al.* (1999) in the skin of Surti buffalo.

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Figs 1–4. 1. During prenatal life showing cartilaginous core (arrow) and loosely arranged connective tissue (CT). H&E $\times 40$. 2. During pre natal life showing developing hair follicle (arrow) and loosely arranged connective tissue (CT). H&E $\times 40$. 3. During postnatal life showing elastic cartilage (C), blood vessel (B) and nerve bundles (arrow). H&E $\times 100$. 4. During postnatal life showing epithelium (E), hair follicle (arrow), sweat gland (S) and sebaceous gland (SB). H&E $\times 100$.

The epidermis like other skin structure anchored to the connective tissue of dermis by forming epidermal pegs which was interdigitating with the dermal papilla (Fig. 4). The surface epidermis was continuous with the cellular layer of the hair follicle that surrounded the hair. The hair follicle of hair had a lightly stained medulla and darkly stained cortex. Epidermis of the tassel gland was lined by stratified squamous epithelium as reported by Lancker *et al.* (2005) in cornual gland and caudal gland of goats and Jenkinson *et al.* (1967) in the skin glands of goats.

The histology of tassels, the ornamental structure of some breeds of goat resembles that of skin but not totally similar to that of it. Neither it is fully similar histologically to that of other skin glands. This needs to be established whether it contributes to sexual recognition within a breed of goat or it performs some other function.

SUMMARY

The study was conducted on tassels of 3 fetuses and 3 adult animals to reveal the prenatal and post natal development of tassels. During the prenatal life, tassels consisted of a core of cartilage, dermis and epidermis. The cartilaginous core consisted of a well developed perichondrium. The dermis consisted of connective tissue containing mainly of collagenous fibres. During the prenatal life the epidermis layer of tassels was lined by a basal layer and three to four lightly stained superficial layers. In the epidermis many hair follicles were observed in the form of follicular plug. The sweat gland primordia could be observed during the prenatal tassels. The development of the sebaceous glands is closely related to hair follicle. Similar to the prenatal life the tassels during the postnatal life consisted of a core of cartilage, dermis and epidermis. The dermis consisted of well developed connective tissue with many blood vessels and nerve fibres. Sebaceous glands and sweat gland were

numerous in the dermis of tassels. The epidermis like other skin structure anchored to the connective tissue of dermis by forming epidermal pegs which was interdigitating with the dermal papilla and was lined by stratified squamous epithelium.

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