

VIALB HYPOTRICHOSIS IN A JERSEY CALF

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Various degrees of congenital hairlessness have been seen in cattle, and the literature on this subject has been reviewed by Hutt and Saunders (1953), who have proposed a classification of five categories. Semi-hairlessness in grade Hereford cattle in Queensland has been described by Young (1953). Our paper describes a case of congenital hairlessness in a Jersey calf which we believe to belong to the class "viable hypotrichosis" of Hutt and Saunders.

DESCRIPTION

The calf (Figure 1) was reported to one of the authors by Mr. J. H. Smith, Departmental Dairy Officer at Cooroy. It was a heifer aged four weeks by a grade Jersey bull out of a grade Jersey cow. As far as could be determined the sire and dam were unrelated.



Fig. 1.—Calf at 4 weeks of age.

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Hairlessness.—The calf was completely hairless except for the following areas:—

(1) *Ears.*—Hairs were present on the internal surfaces on the anterior border of the pinnae and on the proximal attachments of the posterior border of the pinnae of both ears.

(2) *Eyes.*—A few reddish eyelashes and a few eyebrow hairs were seen.

(3) *Muzzle.*—Adjacent to the upper and lower lips the usual vibrissae were present but only occasional coat hairs were visible.

(4) *Tail.*—The distal half of the tail was covered by greyish hair forming a tail switch.

(5) *Body.*—Hair density on the ventral aspect of the thorax and abdomen approached normal. The latter was moderately well covered as far laterally as the cutaneous muscle of the flanks. The hair on the thorax was fawn and extended over the lateral aspect of the ventral surface but not over the anterior part of the brisket. There were scattered hairs about the labia of the vulva.

(6) *Limbs.*—Scattered hairs were present around the pasterns, coronets and hocks of all four legs. The hooves were normal and fawn coloured.

Pigmentation.—The skin showed black pigmentation around the muzzle and lips but a light brown pigmentation was present in the skin over the head, neck and lateral aspects of the thorax and abdomen.

Teeth.—There was a normal complement of teeth, the calf having four incisors and four molars in each mandible and three molars in each maxilla.

Necropsy Findings.—The calf died during the night after transportation to the laboratory and a necropsy was conducted the next morning. The calf was in poor condition (weight 41 lb at 4 weeks). Apart from the hairless areas described above, no macroscopic changes were seen. The viscera were normal.

Histological Findings.—Histological examination of the liver, lung and thyroid did not show any abnormality. Apart from the skin section from the upper lip, which showed a few scattered normal follicles as well as the defective ones, 24 skin samples selected from various parts of the body and limbs showed the same picture of uniformly hairless follicles.

The most striking feature was the shallowness of the follicles, which penetrated only to the level of the sebaceous glands in the papillary layer of the dermis instead of extending into the reticular layer as is normal (Figure 2). Most of the follicles (Figures 3-4) were U-shaped and shallow, and all lacked the dermal papillae usually seen projecting into follicles. Their walls showed little differentiation but contained concentric layers of keratin derived from cornification

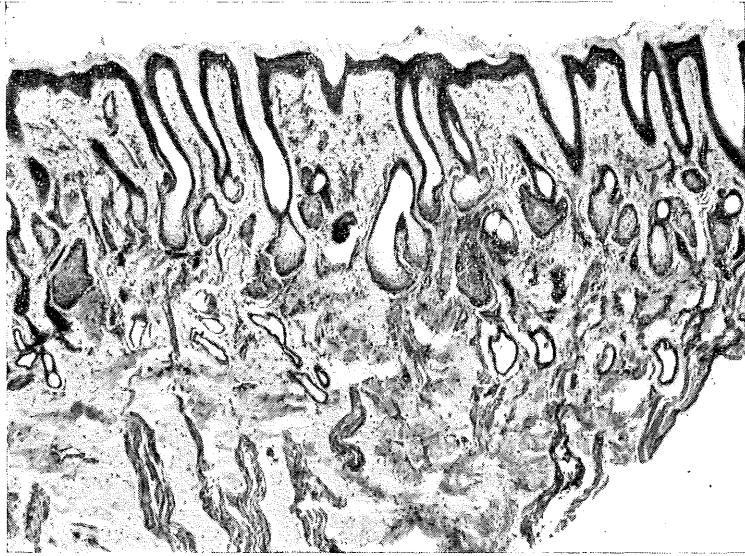


Fig. 2.—Skin from upper lip near muco-cutaneous junction. Note the shallow follicles. Haematoxylin and eosin. X50 (X16 $\frac{2}{3}$, enlarged 3 times. Wratten filters Nos. 11 and 15).



Figs. 3 (left) and 4 (right).—Skin from middle of lateral surface of metacarpus. The follicles extend only to the sebaceous glands. X150 (X75, enlarged twice. Wratten filters Nos. 11 and 15).

of the walls. This keratin was continuous with the thin layer which covered the skin and appeared macroscopically as a thin scurf. Comparison with skin sections from apparently normal animals of approximately the same age indicated that there was no significant reduction in follicle density.

Sweat glands and sebaceous glands were plentiful and the former were quite prominent (Figure 2), although unlike the case reported by Hutt and Saunders (1953), they were not over-distended or cystic.

DISCUSSION

Hutt and Saunders (1953) attempted to systematize the different types of congenital hypotrichosis, and the following is a brief resumé of their classification:—

(1) *Lethal Hairlessness*.—The calves are born alive at full term but die within a few minutes of birth. Hair is confined to clearly demarcated areas, viz. muzzle, eyelids, ears, tail and pastern, but in the hairless areas the development of the hair follicles is arrested at an early stage. Teeth and hooves are normal. The condition, which has been seen in Holstein-Friesians in Sweden and Germany (Eisele 1936) and in Japanese cattle (Shibata and Ishihara 1949), is considered to be due to a simple autosomal recessive gene in the homozygous state.

(2) *Semi-hairlessness*.—At birth calves have a thin coat of short, fine, curly hair but later develop coarse, wiry hair which is not present in normal amounts. Craft and Blizzard (1934) and Kidwell and Guilbert (1950) showed that a simple recessive autosomal mutation caused this defect in Poll Herefords. No histological examination appears to have been carried out.

(3) *Hypotrichosis with Anodontia*.—At birth these calves lack hair (including eyelashes) and teeth but later develop some hair. Drieux *et al.* (1950) considered this defect was due to a sex-linked recessive gene. Histologically, there is malformation of the dermal papillae and cystic degeneration of the sweat glands, which lack excretory tubules.

(4) *Viable Hypotrichosis*.—Where the hairlessness is intermediate between Class 1 and Class 3 and hair is confined to inner surface of ears, eyelids and extremities of tail and legs. In Hutt and Saunders' (1953) case, microscopic examination of the skin showed hair follicles which lacked dermal papillae and which showed poor differentiation of the cells of the follicle wall. Sweat glands were cystic. This defect is transmitted as a simple autosomal recessive character.

(5) *Miscellaneous*.—Hutt and Saunders (1953) placed the defect of the hair and incisor teeth in Holstein-Friesians noted by Cole (1919) in this class.

Our case fits well into the class "viable hypotrichosis" as defined by Hutt and Saunders' (1953).

Hair was confined to the areas they describe and the histological picture (except for the absence of cystic sweat glands) was the same as described in their case. The absence of hair growth is due to the malformed hair follicles, which lack dermal papillae and the germinal area which secretes hair. As Hutt and Saunders' case was 10 weeks of age and ours was only 4 weeks it is possible that the difference in the sweat glands was due to age. It is possible that keratin plugs may have blocked the orifices in the older animal.

Many authors have indicated that these types of developmental anomalies are of genetic origin. No precise information could be gleaned about the hereditary background of our case so that evidence of genetic origin could not be given. The majority of cases of hypotrichosis appear to be produced by simple, recessive, autosomal genes and it is probable that the present case was produced in a similar fashion. If the cases are indeed caused by the same gene, then it appears to be widespread, having been reported previously in Jersey, Guernsey, Holstein-Friesian, Poll Hereford, Hereford and Ayrshire cattle.

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