

"Melakril" preparation influence on trade characteristics and dermal integument of mink (*Mustela*)

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"Melakril" implantation realizes progressive morphogenesis of dermal integument, as biodermal system and rises trustworthy improvement strength and elastic-dermatation characteristics of dermal tissues. On its trade-technological indices, structural appearance and metabolic activity, the dermal integument of minks, implanted by hormonal preparation "Melakril" often excel its control analogues. The thickness of epidermis of implanted animals yields to tanned ones, and that connected correlate with rising of thick-haired integument. Hide tissue of one year old age animals is characterized by denser in comparison with control one, by package of collagen fiber, but less quantity of representation of elastic component. Implantation of preparation to young minks is accompanied by rising of refraction degree of collagen and of activity its trophic and consolidation functions. Hair follicles in dermal integument of animals of tested group lie less deep ($612,3 \pm 31,3$ mkm) than at control one ($704,0 \pm 20,8$ mkm), and it prevents appearance the defect as "draught" in dressed hide of tested group rising of firm fur articles. Implantation of hormone preparation "Melakril" doesn't influence of length, thickness, and softness of hair, but it promotes to rising its density and thickness of hair integument on 7,1 thousand unites / sm^2 , as well as on 1,2% of its specific weight, that improves the quality of hides. The preparation "Melakril" doesn't provoke changes in chemical composition of hides of tested animals. The use of preparation "Melakril" in fur farming industry differs by high economy expediency.

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Ultrastructural features of common sperm defects in the cane rat (*Thryonomys swinderianus*)

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The cane rat or grasscutter is widely distributed throughout sub-Saharan Africa and its potential for alleviating the continent's chronic protein shortage has been recognized. However, little is known about the reproductive biology of this rodent. In view of the fact that the identification of sperm abnormalities forms an important aspect of semen evaluation, this paper describes the principal sperm defects observed in cane rat semen.

Semen was collected from the ductus deferens of six healthy and sexually mature male cane rats slaughtered at the Irene Animal Production Institute, Gauteng, South Africa. The samples were fixed in 3% glutaraldehyde in 0.1 M sodium cacodylate buffer, post-fixed in similarly buffered 1% osmium tetroxide and routinely prepared for scanning (SEM) and transmission (TEM) electron microscopy.

The most obvious head defects observed were vacuolar defects, bizarre heads and variations in head shape and size. On SEM, the vacuolar defect manifested as a variable number of crater-like depressions on the surface of the sperm head. The craters were generally restricted to a band immediately beneath the caudal termination of the acrosome forming the typical "diadem" defect. On TEM the craters were seen to be confined to the nucleus and communicated with the peri-nuclear space via a narrow stalk. They did not open onto the cell surface but were covered by the acrosome or post-acrosomal dense lamina. Bizarre heads took on a number of forms but characteristically were large cells with misshapen nuclei. Cane rat sperm displayed a wide variation in head shape and size. This pleomorphism made it difficult to accurately assess this anomaly. However, heads with a narrow base (pyriform/tapered heads) and those with a broad base (often associated with abaxial tail

implantation) were obvious and commonly encountered. Apart from a few instances of acrosome lipping, no acrosome defects were observed in the material studied.

The principal tail defects were double tails, stump tails, kinked tails and bent tails. SEM of double-tailed sperm generally revealed a normal head and two perfectly formed tails consisting of a midpiece, chief-piece and end-piece. Separation of the two tails was variable along the length of the double flagellum. The morphology and alignment of the axoneme, mitochondrial sheath and connecting piece of the neck region all appeared normal when viewed by TEM. Stump tails displayed a variety of forms and were best visualized by SEM. In some instances the tail was rudimentary, consisting only of a small bead of cytoplasm attached to the base of the head. In other cells the tail was of variable but shortened length and generally displayed no obvious regional characteristics. Kinked tails generally appeared normal except that the head and tail were oriented at right angles to each. Tail bending most often occurred in the region of the midpiece where it was sharply reflected and often associated with a cytoplasmic droplet. Tail coiling, typical of the "Dag defect" was only occasionally seen in the material examined.

Multiple defects were common in cane rat sperm. Nuclear vacuolation (the diadem defect), for example, was often associated with double-tailed sperm as well as with stump-tailed sperm.

The sperm defects observed in cane rat sperm have also been described in various other mammalian species. Nuclear invaginations (vacuolation) have specifically been identified in elongating spermatids and epididymal sperm in two other hystricomorph rodents and this defect would appear to be particularly common to this group of animals. Although no causative factors could be determined for the presence of the various defects in the animals studied, the fact that a number of the defects have been associated with infertility/subfertility makes it important to consider these defects when evaluating cane rat semen.

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Application of variable pressure scanning electron microscopy (VP-SEM) to non-coated biological samples: Improvement of the image quality by using helium gas in a low-voltage, low-vacuum environment

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The variable pressure scanning electron microscope (VP-SEM) has been applied to the observation of biological samples without metal coating. It is also helpful for the observation of wet and/or oily samples. The VP-SEM further has the potential to observe a variety of specimens without the need of conventional specimen preparation. However, the range of the proper observation condition (*i.e.*, the relation between the accelerating voltage and pressure) is generally rather narrow in each sample.

We recently showed that the quality of the VP-SEM image signals (by backscattered electrons) is dramatically improved by introducing helium gas into the specimen chamber (Oho et al. 2000). This method is especially useful in low-voltage as well as in a variety of SEM operating conditions, because helium gas can relatively keep the amount of unscattered primary electrons. In the present study, we mainly describe the quality improvement of the image signals obtained from the newly developed environmental secondary electron detector (ESED), which was originally introduced for low-vacuum SEM (Danilatos 1990; Farley and Shah 1991).

Figures 1a and 1b are ESED images operated under air and helium gas, respectively. The accelerating voltage is 5kV, the working distance 14.6 mm, and the pressure 80 Pa for air and 330 Pa for helium. SEM imaging using the ESED under helium gas was helpful in a whole range of pressure. In contrast, imaging in air was practical only under a relatively low pressure. Under the pressure of 330 Pa, no clear image was obtained under air. Surprisingly, it was very difficult to observe the surface structure of samples even under the pressure of 80 Pa (b), which is a common pressure frequently employed in the VP-SEM routine work.