

## MORPHOLOGICAL AND PHYSIOLOGICAL CHANGES IN SPERMATOZOA OF HOUSE RAT DURING PASSAGE THROUGH THE EPIDIDYMIS

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### ABSTRACT

Morphological changes in sperm are one aspect of a maturation process during epididymal transit in mammals. Taking into account the importance of the sperm epididymal maturation process and the consequential changes in the spermatozoa, we studied different sperm malformations in the caput, corpus and cauda regions of the epididymis of healthy and sexually mature house rats in order to determine the origin of these sperm abnormalities. Migration of the cytoplasmic droplet and induction of motility originate in caput and increases progressively through corpus to cauda regions. During epididymal transit the percentage of immature and unviable spermatozoa decreases, indicating the existence of a mechanism that removes abnormal spermatozoa. The primary abnormalities like sperm head/acrosomal defects, acrosomal abnormalities and midpiece abnormalities were observed to be constant. In contrast, there was a small but significant increase in the proportion of spermatozoa with secondary abnormalities during epididymal transit. The results of this study demonstrate that the proportions of sperm abnormalities originating in the testes decrease during epididymal transport, while some sperm tail abnormalities may actually originate in the epididymis. Furthermore, the morphometric studies showed a significant decrease in sperm head dimensions during passage through epididymis, probably due to acrosomal condensation. The change in acrosome size during epididymal passage is discussed in relation to the development of fertilizing ability of rat spermatozoa. The complex epididymal maturation process of the sperm results in quantitative and qualitative changes that can be characterized in each of the three epididymal regions.

**KEYWORDS:** Epididymal Maturation, House Rat, Spermatozoa, Abnormalities, Morphometry, Cytoplasmic Droplet