

Journal of Andrology, Vol 17, Issue 2 117-126, Copyright © 1996 by The American Society of Andrology

JOURNAL ARTICLE

Changes in luminal fluid protein composition in the rat cauda epididymidis following partial sympathetic denervation

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Sympathetic denervation of the rat cauda epididymidis by surgical removal of the inferior mesenteric ganglion (IMG) results in an excessive accumulation of sperm in the cauda epididymidis as well as significant changes in cauda sperm motility and cauda epididymal gross histology. The objective of the present study was to determine if the cauda-specific changes in sperm storage, sperm motility, and epididymal histology following the loss of sympathetic innervation were accompanied by changes in the protein composition of epididymal fluid. One and 4 weeks after surgical IMG removal or sham operations, luminal fluid obtained from the caput and cauda epididymidis and cauda epididymal sperm-associated proteins were subjected to two-dimensional polyacrylamide gel electrophoresis (2-D PAGE) and silver-stained proteins were quantitated. One week after IMG removal, two cauda epididymal fluid (CEF) proteins (2 and 13) had increased 43% and 49%, respectively, whereas four CEF proteins (5, 8, 9, and 19) had decreased between 30% and 73% compared to controls. Four weeks after IMG removal, changes in CEF proteins observed 1 week following surgery were no longer present, but the staining intensities of three additional CEF proteins (11, 12, and 18) were reduced an average of 70% compared to control CEF proteins. By obstructing the cauda epididymidis, we confirmed that the changes in CEF protein composition observed following IMG removal were not the result of sperm accumulation but were due directly to the loss of innervation; the staining intensity of CEF protein 2 increased as a result of excessive sperm accumulation in the cauda epididymidis both in the presence and absence of innervation from the IMG. No significant changes in caput epididymal fluid proteins or cauda epididymal sperm-associated proteins were detected following IMG removal. These data show that the protein composition of rat CEF is significantly affected by the loss of sympathetic innervation and suggest that neuronal input may play an important role in the maintenance of epididymal function.

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