



Journal of Andrology, Vol 22, Issue 1 124-135, Copyright © 2001 by The American Society of Andrology

JOURNAL ARTICLE

Expression and regulation of metallothioneins in the rat epididymis

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Metallothioneins (MTs) are cytosolic proteins involved in cellular stress responses. The objectives of this study were to determine which epididymal cells express MTs, how they are regulated, and whether mRNA levels for 3 MT isoforms (MT I, MT II, and MT III) are modulated by heavy metals. MT expression was noted mainly in basal cells of all epididymal regions but not in all basal cells of any given region. MT I mRNA levels were highest in the testis, followed by levels in the corpus, cauda epididymidis, liver (positive control), caput epididymidis, initial segment, seminal vesicles, and ventral prostate. MT II mRNA levels were also highest in testis, followed by levels in the cauda, corpus, liver, caput, and initial segment, but they were undetectable in the seminal vesicles and ventral prostate. MT III mRNA levels were highest in the caput followed by testis and initial segment. Orchidectomy and orchidectomy with testosterone replacement experiments showed that immunoreactive MT in all epididymal segments was androgen dependent. Epididymal MT I mRNA levels were dependent on androgens in all segments except the corpus. MT II mRNA levels were androgen dependent only in the initial segment and corpus. MT III mRNA levels in the initial segment were not altered by orchidectomy but increased significantly in testosterone-treated rats. In the caput, MT III mRNA levels decreased following orchidectomy, but control levels were maintained by testosterone. In cadmium-injected rats, MT I mRNA levels were significantly increased in the testis and initial segment, but there were no effects in the liver and other epididymal regions. MT II mRNA levels were increased by more than eightfold in the liver and by three- to fourfold in the initial segment and caput. In the corpus, MT II mRNA levels were decreased by cadmium treatment. MT III mRNA levels were unaltered by cadmium treatment. In conclusion, all 3 MT transcripts are present in high abundance in the epididymis. Furthermore, MT is expressed mainly in basal cells with regulation by testosterone. Heavy metal induction appears to affect the proximal regions of the epididymis.

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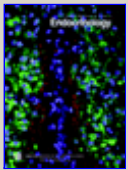
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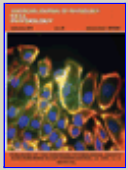
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