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JOURNAL ARTICLE

Targeted disruption of the cation-dependent or cation-independent mannose 6-phosphate receptor does not decrease the content of acid glycosidases in the acrosome

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The acrosome is a unique organelle containing acid hydrolases common to lysosomes as well as unique enzymes. Its ultimate exocytosis, as well as the absence of several lysosomal markers, has led to the speculation that it should be considered a secretory or zymogen vesicle rather than a specialized lysosome. The basic targeting machinery for eukaryotic lysosomal acid glycosidases are the two mannose 6-phosphate receptors. Mouse testicular germ cells are known to express both the cation-independent (CI-MPR) and cation-dependent (CD-MPR) forms of the mannose 6-phosphate receptors, but the CD-MPR is predominant. In this report, we utilized the recent targeted disruption of the CD-MPR and CI-MPR genes to determine whether these mutations affect targeting of acid glycosidases to the acrosome. Antibody to luminal fluid beta-D-galactosidase was used to examine the targeting of immunoreactive product within the acrosome of permeabilized spermatozoa and testicular spermatids. No obvious changes in acrosomal immunoreactivity in either MPR homozygous mutant were observed when compared with the case of wild-type littermates. In addition, targeted disruption of either MPR did not result in decreased levels of beta-D-galactosidase, alpha-D-mannosidase, or N-acetylglucosaminidase activities in spermatozoa from either MPR-homozygous mutant. These results suggest that the targeted disruption of either MPR does not result in decreased acrosomal targeting efficiency.

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