Journal of Andrology, Vol 22, Issue 1 96-103, Copyright © 2001 by The American Society of Andrology

JOURNAL ARTICLE

Detection of the mouse acrosome reaction by acid phosphatase. Comparison with chlortetracycline and electron microscopy

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The sperm acrosome is a uniquely regulated secretory vesicle containing several hydrolase enzymes, including acid phosphatase (AP). The exocytotic event that releases these enzymes, the acrosome reaction, is required for fertilization in mammals. Different methods have been described in the scientific literature for detection of the acrosome reaction: double and triple stains, fluorescent-lectin stains, monoclonal antibodies against acrosomal antigens (immunodetection techniques), Coomassie blue, differential interference contrast or phase contrast, flow cytometry, and chlortetracycline (CTC). In contrast, only 1 method to detect AP released by live and reacted sperm has been described in the literature thus far. In this work we compare 2 classical methods, CTC and transmission electron microscopy (TEM), with the assay of AP released from the acrosome. AP released during the acrosome reaction was measured in the culture medium. Enzyme remaining in nonreacted sperm cells was released by Triton X-100 treatment. This enzyme-based methodology shows an increase of AP in the culture media after the acrosome reaction and a corresponding decrease in the detergent-releasable enzyme. The AP assay thus permits the detection of the mouse acrosome reaction and compares well with the CTC and TEM methods. This method is performed on the whole sperm population and so avoids the observer error that is inherent in light microscopic methods.

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