

Journal of Andrology, Vol 19, Issue 1 31-36, Copyright © 1998 by The American Society of Andrology

JOURNAL ARTICLE

Catalase and oviductal fluid reverse the decreased motility of bovine sperm in culture medium containing specific amino acids

S. Lapointe and M. A. Sirard

Centre de Recherche en Biologie de la Reproduction, Département des Sciences Animales, Université Laval, Ste-Foy, Québec, Canada.

The motility and velocity of bovine spermatozoa incubated in TCM-199 are reduced in comparison with those incubated in a simpler media made for sperm, such as modified Tyrode (Sp-Talp). Moreover, a previous study showed that oviductal cells conditioned media prevented this decreased motility in TCM-199. Preliminary results lead us to suspect that amino acids in TCM-199 were involved in the reduced survival. Therefore, the current experiment aimed at determining which amino acids were involved and what their mechanism of action involved. Amino acids were added separately in Sp-Talp at the final concentration found in TCM-199. Frozen-thawed bovine spermatozoa were washed twice by centrifugation in Sp-Talp and diluted to 25×10^6 (6)/ml in the amino acid media. After 6 hours of incubation at 37 degrees C, sperm motility and velocity were recorded. The percentage of motile sperm was significantly lower in the presence of phenylalanine ($6\% \pm 2$, $P < 0.05$) compared with the control ($46\% \pm 2$). Sperm velocity (VAP, microm/second) was lower in the presence of phenylalanine (50 ± 4) and tyrosine (89 ± 3) compared with the control (119 ± 4 , $P < 0.05$). Increased concentrations of the three aromatic amino acids (0, 0.2, 1, five times TCM-199 concentrations) decreased both sperm motility and velocity in a dose-dependent manner. Cysteine and methionine, added at 250 microg/ml, showed a negative effect on sperm motility and/or velocity, as did the three aromatic amino acids. Presence of catalase (0.01 mg/ml) in the amino acid-supplemented Sp-Talp for 6 hours kept sperm motility and velocity at control levels, suggesting that the toxic effect of amino acids acts on sperm by excess hydrogen peroxide production. Because the oviduct contains amino acids, and its role as a reservoir for sperm survival is well known, oviductal fluid was collected and tested. Oviductal fluid reversed the negative effect of amino acids, similar to the action of the catalase. Oviductal fluid also kept the peroxide concentrations of media containing phenylalanine at basal levels (<10 microm) compared with phenylalanine alone (approximately 40 microm). These results suggest the presence of catalase activity in oviductal fluid.

This Article

- ▶ [Full Text \(PDF\)](#)
- ▶ [Alert me when this article is cited](#)
- ▶ [Alert me if a correction is posted](#)

Services

- ▶ [Similar articles in this journal](#)
- ▶ [Similar articles in PubMed](#)
- ▶ [Alert me to new issues of the journal](#)
- ▶ [Download to citation manager](#)

Citing Articles

- ▶ [Citing Articles via HighWire](#)
- ▶ [Citing Articles via Google Scholar](#)

Google Scholar

- ▶ [Articles by Lapointe, S.](#)
- ▶ [Articles by Sirard, M. A.](#)
- ▶ [Search for Related Content](#)

PubMed

- ▶ [PubMed Citation](#)
- ▶ [Articles by Lapointe, S.](#)
- ▶ [Articles by Sirard, M. A.](#)

This article has been cited by other articles:



H. Chen, P. H. Chow, S. K. Cheng, A. L. M. Cheung, L. Y. L. Cheng, and W.-S. O

Male Genital Tract Antioxidant Enzymes: Their Source, Function in the Female, and Ability to Preserve Sperm DNA Integrity in the Golden Hamster

J Androl, September 1, 2003; 24(5): 704 - 711.

[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)



C. Reyes-Moreno, M. Boilard, R. Sullivan, and M.-A. Sirard
Characterization and Identification of Epididymal Factors That Protect Ejaculated Bovine Sperm During In Vitro Storage

Biol Reprod, January 1, 2002; 66(1): 159 - 166.

[\[Abstract\]](#) [\[Full Text\]](#)