Journal of Andrology, Vol 8, Issue 1 14-24, Copyright © 1987 by The American Society of Andrology

JOURNAL ARTICLE

Biochemical studies of metalloendoprotease activity in the spermatozoa of three mammalian species

W. Gottlieb and S. Meizel

Ejaculated porcine and human spermatozoa, hamster spermatozoa from the cauda epididymidis, isolated hamster sperm heads and hamster cytoplasmic droplets contained activity that hydrolyzed the metalloendoprotease substrate ABZ-Ala-Gly-Leu-Ala-NBA (AAGLAN). Hamster sperm heads were isolated by treating spermatozoa with proteinase K and removing sperm tails with Dowex-50W beads. Hamster sperm activity was characterized using spermatozoa from which cytoplasmic droplets were removed by sonication and centrifugation. Porcine sperm preparations were essentially free of cytoplasmic droplets, while human sperm preparations retained somewhat more droplet material. Activity from all of these sources was inhibited by the metalloendoprotease inhibitors phosphoramidon, 1,10-phenanthroline, CBZ-D-Phe and CBZ-L-Phe but was not competitively inhibited by the metalloendoprotease substrate CBZ-Ser-Leu-amide. The AAGLAN hydrolyzing activity found in intact spermatozoa of all three species had a pH optimum of 6.2, while the optimum of the hamster sperm cytoplasmic droplet activity was 7.0. In addition, hamster sperm preparations were inhibited by ZnCl2 and dithiothreitol, but were not affected by toluene, benzamidine or chymostatin. The AAGLAN hydrolyzing activity of hamster sperm preparations was reduced, but not eliminated, by dialysis. It is concluded that spermatozoa from all three species, hamster sperm heads and hamster cytoplasmic droplets contain metalloendoprotease activity. Furthermore, metalloendoprotease activity found in hamster cytoplasmic droplets is different from that found in spermatozoa.

This article has been cited by other articles: