Journal of Andrology, Vol 19, Issue 1 58-64, Copyright © 1998 by The American Society of Andrology

JOURNAL ARTICLE

Evidence for nitric oxide regulation of hamster sperm hyperactivation

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Involvement of reactive oxygen species has been implicated in the process of hyperactivation and capacitation of sperm. Nitric oxide has recently been found to function both as an intracellular and extracellular messenger, with its synthetic enzyme found in several cell types, including male and female genital tract organs. The objective of the present study was to investigate the role of nitric oxide in hamster sperm hyperactivation. Caudal epididymal contents of mature golden hamster sperm were diluted with human tubal medium supplemented with a sperm motility preparation. Inhibitors of nitric oxide synthase (nitro-L-arginine, methyl-L-arginine, and 1,3-phenylene-bis[1,2-ethenediyl]-bis-isothiourea) were added to incubation media in various doses. Alternatively, a nitric oxide donor, sodium nitroprusside, was used. The percentage motile and grade of movement were recorded at intervals encompassing the normal period of capacitation and hyperactivation. Acrosomal status was evaluated by phase contrast microscopy. Inhibition of nitric oxide synthesis did not affect motility during early capacitation but dramatically inhibited later hyperactivation. An inactive stereo-enantomere of the inhibiting drug had no effect. Addition of nitric oxide to nonstimulated sperm induced hyperactivation in a similar time course. In conclusion, nitric oxide plays a significant role in hyperactivation of hamster epididymal sperm.

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