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JOURNAL ARTICLE

Effects of glucose and other energy substrates on the hyperactivated motility of macaque sperm and the zona pellucida-induced acrosome reaction

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Energy sources in sperm capacitation media have various effects on mammalian sperm and are required for stimulation of hyperactivated motility and/or acrosome reactions in some species. The present experiments were performed to investigate the energy substrate requirement for these two functions of macaque sperm. Semen from six cynomolgus macaques was washed through 60% Percoll, resuspended, and washed with Biggers, Whitten, and Whittingham media. In one set of experiments, sperm were incubated in the complete capacitation medium or in medium without glucose. In another set of experiments, the complete medium was used for comparison with medium containing no energy substrates. The absence of glucose did not affect survival of sperm during a 6-hour incubation period; however, removal of all energy substrates resulted in a decrease in percent motility by 3 hours. Sperm were incubated for 1 hour prior to evaluation of sperm motility by computer-aided sperm analysis and sperm-zona binding experiments. During the last 30 minutes of incubation, half of the aliquots of sperm suspensions were treated with activators (ACT; caffeine and dbcAMP, 1 mM each). As previously reported, when sperm were incubated in complete medium and treated with ACT there were changes in sperm movements that are consistent with hyperactivation. Similar or greater changes were observed in sperm that were incubated prior to treatment with ACT in glucose-free medium or in medium without any energy substrates. Whether sperm were incubated in complex medium or in glucose-free medium, sperm binding to zonae was enhanced when the sperm were treated with ACT. (ABSTRACT TRUNCATED AT 250 WORDS)

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