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JOURNAL ARTICLE

Stimulation of cryopreserved epididymal spermatozoa of the domestic cat using the motility stimulants caffeine, pentoxifylline, and 2'-deoxyadenosine

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We have investigated the effects of caffeine, pentoxifylline, and 2'-deoxyadenosine on the motion characteristics and longevity of domestic cat spermatozoa. Freshly collected or cryopreserved domestic cat epididymal sperm were incubated with 0.01-20 mM caffeine, pentoxifylline, or 2'-deoxyadenosine for 15 minutes at 23 degrees C. The percent motility (MOT), curvilinear velocity (VCL), linearity (LIN), straight line velocity (VSL), and amplitude of lateral head displacement (ALH) were determined for each group using computer-assisted semen analysis. Freshly collected domestic cat sperm exhibited a strong forward progressive movement, and treatment with caffeine, pentoxifylline, or 2'-deoxyadenosine did not consistently alter sperm motion. Following cryopreservation, spermatozoa exhibited decreased ($P < 0.05$) MOT, VCL, VSL, and ALH. Caffeine and pentoxifylline increased ($P < 0.05$) the MOT, VSL, VCL, and ALH of cryopreserved sperm at 0.01-20 mM, in a dose-dependent manner. 2'-Deoxyadenosine also increased ($P < 0.05$) both VSL and VCL at 1.0 mM, and MOT, VSL, VCL, and ALH at 10 mM. All treatments shifted the percentage of nonhyperactive sperm to either a transitional or hyperactivated state. The motility indices of cryopreserved samples were examined during a 6-hour incubation to assess the effects of caffeine, pentoxifylline, and 2'-deoxyadenosine on sperm longevity. Compared to untreated control samples, the longevity of stimulated cryopreserved sperm was not reduced. These results indicate that motility stimulants may prove useful for enhancing the fertility of cryopreserved cat sperm by increasing their motility and producing hyperactivated motion.

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