Stimulation of Cryopreserved Human Sperm Following Treatment With Sodium Nitroprusside, 2-Chloroadenosine, and 2-Deoxyadenosine. RK Sharma, AJ Thomas Jr. and A Agarwal. Andrology Laboratory, Department of Urology, Cleveland Clinic Foundation, Cleveland, OH.

Objective: Sperm motility significantly reduces after cryopreservation, diminishing the therapeutic insemination outcome. We studied the effect of sodium nitroprusside (SNP), a nitric oxide donor, 2-chloroadenosine (2-CLA) and 2-deoxyadenosine (2-DA) - adenosine analogues in cryopreserved human sperm.

Design: Sperm motility and motion characteristics (curvilinear velocity, VCL; straight line velocity, VSL; average path velocity, VAP; linearity, LIN, and amplitude of lateral head displacement, ALH) were evaluated in cryopreserved post thaw sperm with varying concentrations of SNP, 2-CLA, and 2-DA over a post-thaw period of up to 180 minutes.

Materials and Methods: Post-thaw, cryopreserved human sperm samples (n=11) were washed and divided in four aliquots for each stimulant studied. SNP (0, 50, 100, and 200 nM), 2-CLA (0, 25, 50 and 100 μM) and 2-DA (0, 1, 2 and 5 mM) were mixed 1:1 with modified human tubal fluid. Sperm motility and motion characteristics were assessed on a computer-assisted semen analyzer 0, 30, 60, 120 and 180 minutes after post-thaw.

Results: Compared with the control, SNP at 100 and 200 nM concentration significantly improved the percent motility at 30 and 60 minutes time interval. Improved motility was effectively maintained even at 180 minutes post-thaw, the average motility was (47.5% and 44.5%, P < .01). 2-CLA effectively maintained improved sperm motility at all concentrations studied up to 180 minutes. Compared to the control, average percent motility increased by 25.4% (25 μM), 48.2% (50 μM) and 46.2% (100 μM); significant at all concentrations (P < .01) at 180 minutes post-thaw. VCL, VSL, and VAP were significantly improved (P < .01) at 30 and 60 minutes incubation period. At 120 minutes post-thaw, VCL was improved (P < .01) at 25 and 100 μM concentration of 2-CLA, whereas, increase in VSL was significant (P < .01) at 100 μM concentration after 180 minutes post-thaw. When 2-DA was used, compared with control, percent sperm motility was significantly improved after incubation for 60 minutes (P < .01) and average percent motility was 24.5% (1 mM), 50.0% (2 mM) and 52.0% (5 mM). After 120 minutes post-thaw, both 2 mM and 5 mM 2-DA were equally effective in maintaining sperm motility and significant increase in VCL, VSL, and ALH was observed. These above increases were maintained even at 180 minutes post-thaw.

Conclusion: SNP, 2-CLA and 2-DA can help improve and maintain sperm motility over extended period of 3 hours post-thaw. We conclude that these chemicals can be beneficial in assisted reproductive procedures as motility stimulants. The increase in sperm motion can enhance the fertilizing capacity of frozen spermatozoa.