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Impaired cAMP Signaling in Abnormal Sperm Functions After Spinal Cord Injury Shabnum Haleem, Ping Shu, Hosea F. S. Huang*, Department of Surgery, New Jersey Medical School, Newark and DVA New Jersey Health Care System, East Orange, NJ

Background: Our previous studies suggested that altered cAMP-related signaling events may contribute to abnormal sperm function after spinal cord injury (SCI). Current study examined the effect of SCI on cAMP-related sperm functions in the rats subjected to surgically-induced cord injury.

Research Design and Method: The spinal cord of adult male rats was injured by cord-transection (SCX) or cord-contusion (SCC) at the level T9. Some of these rats were given daily dose of vitamin E (2 or 10 mg/kg) during the chronic phase of the injury for 8-10 weeks.

Results: Eight to ten weeks post-injury, sperm motility was significantly reduced in SCC and SCX rats, and was associated with elevated sperm cAMP contents ($p < 0.01$). In vitro treatment of the sperm with dibutyryl cAMP with or without a phosphodiesterase inhibitor, pentoxifylline, resulted in increases in percent sperm motility and its score, as well as sperm protein phosphorylation in sham control rats; similar results were only seen in some SCC and SCX rats. Furthermore, protein phosphorylation in the sperm from SCX rats was significantly lower than that from SCC rats, indicating that impairment of the cAMP-related sperm functions might be dictated by the extent of cord injury. While sperm motility in SCC and SCX rats was significantly improved by vitamin E feeding, sperm cAMP contents and protein phosphorylation in these rats were not affected. These latter results suggest that the beneficial effects of vitamin E feeding on sperm motility, and perhaps other functions, after SCI were not mediated by the cAMP-related events.

Conclusion: The cAMP-related signaling events in the sperm were impaired after SCI. While sperm motility in SCC and SCX rats was improved by vitamin E feeding, such effects were not mediated by the cAMP-related signaling events.

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