SWACSM Abstract

Effects of Nitrate Supplementation on *In Vivo* Muscle Torque Recovery From BaCl2-Induced Injury

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ABSTRACT

During repair from muscle injury, muscle satellite cells depend on nitric oxide production by immune cells to proliferate and differentiate. Nitrate supplementation has been shown to improve muscle endurance and oxygen consumption, but little is known about the ability of nitrate supplementation to interfere with muscle regeneration following injury. **PURPOSE**: To investigate whether nitrate supplementation affects muscle recovery of force after muscle injury produced by intramuscular injection of barium chloride. **METHODS**: Transgenic male mice (12 weeks old) that express Td-Tomato fluorescent protein in Pax7+ cells (i.e., satellite cells; Pax7CreER-Ai9 mice) were treated with tamoxifen (2 mg in corn oil, i.p.) once a day for 5 days. Four days after the last tamoxifen injection, both legs were subjected to stimulation of the peroneal nerve to evoke contractions of the anterior crural muscles at different frequencies of stimulation (1-200 Hz; i.e., Torque-frequency curve), followed by intramuscular injections of 1.2% BaCl2 (w/v) to produce injury of the tibialis anterior (TA) and extensor digitorum longus (EDL) muscles of the right leg. The contralateral leg served as a non-injured control. Torque-frequency curves were tested for both legs on days 2, 7, 14 and 21 post injury. At day 21, mice were euthanized, and muscles were dissected for histology (TA) and ex-vivo muscle contractility (EDL). A group of mice was treated with 1 g/L of NaNO3 in drinking water (nitrate group) 1 week before muscle injury, and a second group of mice was not treated (water group). **RESULTS**: Mice treated with NaNO3 (nitrate group) showed smaller torque in the non-injured leg compared to water group (103 ± 3 vs 84 ± 2 Nmm/kg, for water vs nitrate groups, respectively). However, the torque produced by the injured leg normalized by the torque developed by the non-injured leg was not different between groups on days 2 (28 ± 13% vs 25 ± 1%), 7 (41 ± 4% vs 35 ± 2%), 14 (81 ± 7% vs 87 ± 1%) and 21 (104 ± 3% vs 105 ± 3%) for water and nitrate groups respectively. **CONCLUSION**: The data suggest that nitrate supplementation decreases nerve-stimulated torque development in uninjured leg but does not change the recovery of torque after BaCl2 injury. Support: TRDRP grant # T29KT0397CA (to L.N.)