

Effects of Type 1 Diabetes on the Mechanoreflex in Rats

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ABSTRACT

Mechanical allodynia is present as early as four days post streptozotocin (STZ) injection in type 1 diabetic (T1DM) rats. This is thought to occur through mechanisms affecting the same thin fiber afferents that evoke the mechanoreflex. **PURPOSE:** In this study, we attempted to determine the effects of T1DM on the mechanoreflex. **METHODS:** We injected (i.p.) 50 mg/kg of Streptozotocin (STZ) or the vehicle (CTL) in either sex Sprague Dawley rat and waited 1 week (STZ: BW=258±31 g, glucose=448±88 mg/dL, HbA1C=6.4±1.0%; CTL: BW=318±54 g, glucose=175±48 mg/dL, HbA1C=4.3±0.2%). On the day of experiment, the right jugular vein and both carotid arteries were cannulated to inject fluids and to measure blood pressure and heart rate, respectively. The rat was placed in a Kopf stereotaxic frame and spinal unit to perform a precollicular decerebration that allowed for termination of anesthesia. The musculature of the left hindlimb was exposed and the Achilles tendon was attached to a force transducer. The tendon was then stretched for 30 seconds using a rack and pinion and the pressor and cardioaccelerator responses were measured. **RESULTS:** We found that the pressor (STZ: Δ MAP=42.11±8 mmHg, n=9; CTL: Δ MAP=18.67±4 mmHg, n=6; p=0.02) but not the cardioaccelerator (STZ: Δ HR=13.67±3 bpm, n=9; CTL: Δ HR=9.67±2 bpm, n=6; p=0.22) responses to tendon stretch were exaggerated 1 week after injecting STZ. Both diabetic and control rats developed similar tensions with tendon stretch. **CONCLUSION:** We conclude that the mechanoreflex is augmented in T1DM rats. Further studies are needed to identify the mechanisms involved in this augmentation.