

## Altered L-Type Calcium Channel Activity in Atrioventricular Nodal Myocytes from Rats with Streptozotocin-Induced Type I Diabetes Mellitus

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**Abstract :** Cardiovascular diseases are frequently reported in patients with Type-1 Diabetes mellitus (DM). In addition to changes in cardiac muscle inotropy, electrical abnormalities are also commonly observed in these patients. In the present study, using streptozotocin (STZ) rat model of Type-1 DM, we have characterized the changes in L-type calcium channel activity in single atrioventricular nodal (AVN) myocytes. Ionic currents were recorded from AVN myocytes isolated from the hearts of control rats and from those with STZ-induced diabetes. Patch-clamp recordings were used to assess changes in cellular electrical activity in individual myocytes. Type-1 DM significantly altered the cellular characteristics of L-type calcium current (ICaL). A reduction in peak ICaL density was observed, with no corresponding changes in the activation parameters of the current. ICaL also exhibited faster time-dependent inactivation in AVN myocytes from diabetic rats. A negative shift in the voltage dependence of inactivation was also evident. These findings demonstrate that experimentally-induced type-1 DM significantly alters AVN L-type calcium channel cellular electrophysiology. The changes in ion channel activity may underlie the abnormalities in the cardiac electrical function that contribute to the high mortality levels in patients with DM.

**Keywords :** cardiac, ion-channel, diabetes, atrioventricular node, calcium channel

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