

# Effects of a Na<sup>+</sup>/Ca<sup>2+</sup> exchanger inhibitor on pulmonary vein electrical

陳亦仁

Wongcharoen w;Chen YC;Chen YJ;Chang CM;Yeh HI;Lin

CI;Chen SA

摘要

## Abstract

**OBJECTIVE:** Pulmonary veins (PVs) are the most important focus for generation of atrial fibrillation. The Na<sup>(+)</sup>/Ca<sup>(2+)</sup> exchange (NCX) current is important in PV electrical activity and cardiac glycosides-induced arrhythmias. The purpose of this study was to investigate whether KB-R7943, a NCX current blocker with preferential inhibition of the Ca<sup>(2+)</sup> influx, may alter PV electrophysiological characteristics and reduce glycoside-induced arrhythmogenicity. **METHODS:** Conventional microelectrodes were used to record the effects of KB-R7943 on action potentials and contractility in isolated rabbit PV tissue specimens with and without administration of ouabain. The ionic currents and intracellular calcium were studied in isolated single cardiomyocytes before and after KB-R7943 by the whole-cell patch clamp and indo-1 fluorimetric ratio techniques. **RESULTS:** KB-R7943 (0, 3, 10, 30 microM) concentration-dependently prolonged APD(50) and APD(90) and decreased the PV firing rates (2.3 +/- 1.2 Hz, 2.1 +/- 1.2 Hz, 1.9 +/- 0.9 Hz, 1.7 +/- 1.1 Hz, n = 7, p < 0.05) and incidences of delayed afterdepolarizations (DADs). KB-R7943 (3, 30 microM) decreased transient inward currents, Ca<sup>(2+)</sup> transient and sarcoplasmic reticulum Ca<sup>(2+)</sup> content. Ouabain (0, 0.1, 1 microM) concentration-dependently increased the PV firing rates and DADs in PVs with spontaneous activity (n = 7) and induced nonsustained spontaneous activity (1 microM) in the PVs without spontaneous activity (n = 14). However, in the presence of KB-R7943 (30 microM), ouabain (1 microM) did not increase the PV firing rates or induce spontaneous activity in the PVs without spontaneous activity (n = 7). **CONCLUSIONS:** KB-R7943 reduces the PV arrhythmogenic activity and prevents the ouabain-induced arrhythmogenicity. Our findings support the role of the NCX current in the PV electrical activity.