

non-selective cation current (NSCC) of cardiomyocytes from rabbit pulmonary vein sleeves (PVC) plays an important role in the lengthening of action potential. Our research tried to illuminate that the NSCC of cardiomyocytes from rabbit pulmonary vein sleeves (PVC) were TRPC3-like channels. Besides, we investigated a further role that the TRPC3-like channels played in early after depolarisation (EAD) and the ionic mechanism of the paroxysmal atrial fibrillation originated from the pulmonary vein sleeves.

**Methods** The whole-cell patch clamp technique was used to test action potential and ionic currents in both PVC and left atrial cardiomyocytes (LAC). Then insulin and OAG (both are agonist of TRPC3) were added separately into the bath solution to record the effect on the action potentials and ionic currents in both PVC and LAC.

**Results** The average of action potential duration (APD) in PVC had a greater plateau phase while this was not the case in LAC. The APD<sub>90</sub> in PVC was (399.1±18.2) ms compared with that in LAC was APD<sub>90</sub> (187.2±32.9) ms (n=8) p<0.05. In addition, application of insulin can decrease the action potential durations, the APD<sub>90</sub> in PVC decreased to (279.3±67.5) ms and that in LAC decreased to (173.9±28.5) ms. Application of OAG can get the similar result. Adding GdCl<sub>3</sub> (blocker of TRPC) into bath solution can get the NSCC. The current density of NSCC in PVC was smaller than that in LAC. At -60 mv, the current density in PVC was (0.14±0.07) pA/pF (n=8) compared with that in LAC was (-0.31±0.16) pA/pF (n=8) p<0.05; at +60 mv, the current density in PVC was (0.76±0.12) pA/pF (n=8) compared with that in LAC was (1.68±0.15) pA/pF (n=8) (n=8) p<0.05. Application of insulin or OAG the current densities were increased in both PVC and LAC. Insulin or OAG increased the current densities of non-selective cation channel in both PVC and LAC and the promotion effect was more obvious in LAC.

**Conclusion** The longer action potential duration and the second plateau response in PVC, suggested a strong tendency of EAD generation and furthermore the development of rapid arrhythmias in PVC. The current densities in PVC were significantly smaller than that in LAC. The difference in repolarising ionic currents between PVC and LAC constitutes the basis of the difference in their action potential configuration; the current densities in PVC and LAC can be increased by insulin or OAG (both are agonist of TRPC3). Besides, the APDs can be decreased by adding insulin or OAG in both PVC and LAC suggested that the TRPC3-like channel existed in the PVC and LAC might be TRPC3. Current research reported the TRPC3 in the rabbit PVC and LAC on the electrophysiological level for the first time.

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#### CHARACTERISTICS OF THE ACTION POTENTIALS AND THE TRPC3-LIKE CHANNELS IN THE CARDIOMYOCYTES FROM RABBIT PULMONARY VEIN SLEEVES

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**Objective** Atrial fibrillation is the most prevalent clinical arrhythmia, and most of the paroxysmal atrial fibrillation was found to originate from the main pulmonary veins. The