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Investigation of the active antiarrhythmic components of the multi-herbal medicine xin su ning

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Introduction: A previous study showed that Xin Su Ning (XSN), a multi-herbal antiarrhythmic Chinese medicine prolongs action potential duration (APD) of isolated cardiac myocytes; i.e. displaying class III antiarrhythmic characteristics[1]. In this study we aim to identify the main active components that are responsible for the action potential prolongation of XSN. Several isolated components from XSN were studied. Among the components tested liensinine, from Lianzixin (*Plumula nelumbinis*), one of the 11 herbs in XSN, showed APD prolongation action with a different repolarisation profile compared with XSN.

Methods: Single ventricular myocytes were obtained from the hearts of adult Wistar rats (~300g) by enzymatic dispersion as described previously[2]. The myocytes were continuously superfused with physiological extracellular solution at room temperature (~22-24^{o}C). Action potentials were recorded using the whole-cell patch-clamp techniques with an AxonPatch200B amplifier and Pclamp software. XSN or its isolated component were perfused over the myocytes, and then washed out after a maximal effect of the medicine had been reached. The difference between control and the changes caused by the medicines was statistically tested using Student's t-test.

Results: XSN at 0.4mg/ml and liensinine at 10μM both significantly prolonged APD_{90} as shown in Table1 and Figure1. However liensinine did not prolong APD_{50} compared with XSN's significant prolongation of both APD_{50} and APD_{90}. The effects of XSN and lliensinine were reversible upon the washout.

Discussion: XSN, a patented multi-herbal Chinese medicine, has been sold in China for more than 10 years to treat ventricular arrhythmia without adverse reactions being reported. The medicine was designed to protect the myocardium and regulate cardiac rhythm through its multi-component actions. Liensinine, one of the hundreds components in XSN induced APD prolongation with a different feature compared with XSN; this result opens up a wide range of research of XSN. It is well known there is a lack of antiarrhythmic drugs clinically, which are effective and safe. Studying the antiarrhythmic mechanism of XSN may enrich our knowledge of multi-component antiarrhythmic actions of drugs.

References 1. Ma Y-L et al. (2015). http://www.ascept-bps2015.com/wp-content/uploads/2014/04/ASCEPT-BPS-Poster-programme-and-abstracts. 2. Ma Y-L et al. (2006) European Journal of Pharmacology. 545:87-92

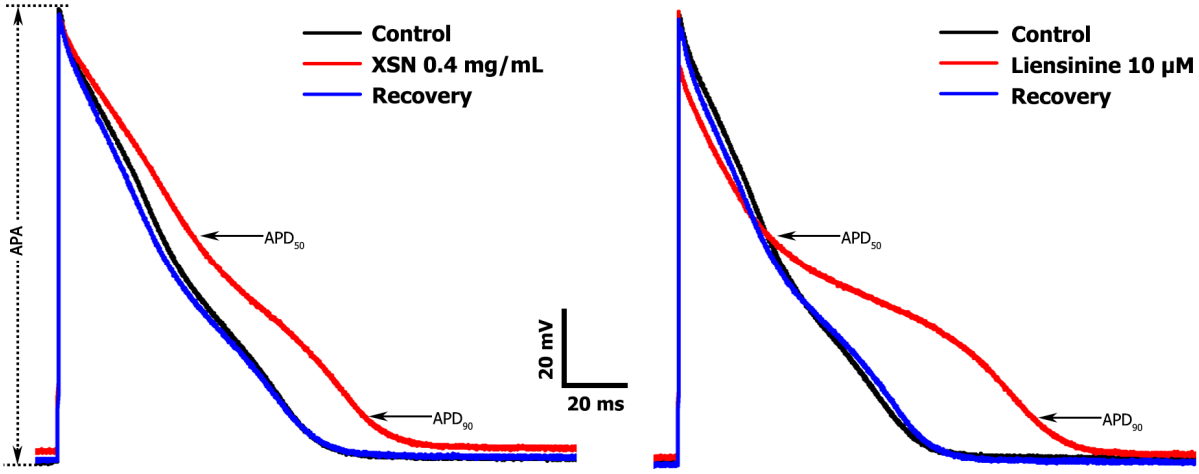

Fig. 1 Effect of XSN and Liensinine on action potiential duration

Table 1 Effect of XSN and liensinine on APD and APA (AP Amplitude). *p<0.05 vs control as 1

	APD_{50} (Normalized)	APD_{90} (Normalized)	APA (Normalized)
Xin Su Ning (0.4mg/ml)	1.34±0.06 (5)*	1.224±0.03 (5)*	0.96±0.02 (5)
Liensinine (10μM)	0.96±0.03 (4)	1.35±0.04 (4)*	0.90±0.07 (4)