sulphide is the third significant endogenous gasotransmitter which can promote angiogenesis, inhibit myocardial remodelling and protect myocardial apoptosis. S-Propargyl-cysteine (SPRC), a novel endogenous Hydrogen Sulphide donor, is proved to mediate the formation of Hydrogen sulphide to inhibit myocardial apoptosis and prevent heart failure. In order to produce stable and sustaining Hydrogen sulphide, we modify the dosage form to get controlled release SPRC. In this work, we elucidated the role of controlled release SPRC on ischaemic heart of rats and explored the involved pathways.

Methods SD rats were subjected to left coronary artery occlusion. The survival rats were divided into seven groups after 48 h and treated with drugs for 6 weeks. Echocardiography indexes including LVID, LVPW, LVAW, EF, FS were determined to investigate the heart function. Angiography was performed to discover the density of vasculature. TTC staining was performed to determine the infarct size. The enzymatic activities of SOD, CK, CAT and GSH were determined by colorimetry. The proteins extracted from myocardial tissues were determined by Western blot.

Results The protective effects of controlled release SPRC were confirmed by significant reduction of infarct size and improvement of cardiac function, with more promotion compared with normal SPRC. LVPW, FS and EF were evaluated in controlled release SPRC-treated group, while LV and LVID decreased. Mechanically, controlled release SPRC was shown to increase protein expression of Bcl-2 and decrease protein expression of Bax, caspase-3 and caspase-9 in peri-infarct area and infarct area when compared to HF rats. Furthermore, Controlled release SPRC induced CSE in both areas, especially in infarct area compared with HF rats. Moreover, Plasmatic concentration of Hydrogen sulphide was significantly higher in controlled release SPRC-treated group. These effects of controlled release SPRC could be abolished by PAG. Controlled release SPRC preserved the level of SOD, CAT, CK and GSH with an increase in plasma. In addition, controlled release SPRC promoted angiogenesis after left coronary artery occlusion, especially in ligation area compared with HF group, with better effects of promotion than normal SPRC.

Conclusions (1) All experiment data indicated the controlled release SPRC played a cardioprotective role on chronic heart failure after myocardial infarction, which was confirmed by improved heart function, decreased myocardial apoptosis and shrinked ventricular remodelling. (2) Endogenous Hydrogen sulphide was partly involved in the cardioprotective effects of controlled release SPRC. (3) Controlled release SPRC exerted better effects than normal SPRC from all sides.

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CARDIOPROTECTIVE EFFECT OF CONTROLLED RELEASE SPRC TO HEART FAILURE OF RATS AFTER MYOCARDIAL INFARCTION AND ITS POSSIBLE MECHANISM

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¹Chengrong Huang, ²Juntao Kan, ¹Xinhua Liu, ³Shujun Wang, ²Yizhu Zhu.¹Department of Pharmacology, School of Pharmacy, Fudan University; ²Department of Pharmacology, School of Pharmacy & IBS, Fudan University; ³Department of Pharmaceutics, School of Pharmacy, ShenYang Pharmaceutical University

Objectives Heart failure (HF) is one of the most serious health issues in both developed and developing countries. Hydrogen