Abstract

Rhizoma Polygoni Cuspidati is the rhizome of *Polygonum cuspidatum* Sieb. et. Zucc. (Huzhang in Chinese) which is a famous Chinese traditional medicinal herb. Historically, the plant has been widely used for expel wind and dampness, dredge the meridians and relieve pain, eliminating phlegm and alleviating cough in China. Various classes of compounds including anthraquinones, stilbenes, flavonoids, and other phenols have been isolated from this plant[1]. Resveratrol, one of its active compounds, has been reported to have significant effect on the treatment of cardiovascular diseases through promoting cardiac protection,[2] vasorelaxation,[3] antioxidant activity[25] and removing blood stasis[4]. However, the mechanism underlying *Rhizoma Polygoni Cuspidati* contributes to the beneficial effect in cardiovascular diseases is not clear yet. During heart injury, the cardiac stem cells are believed to place an important role in myocardial repair.[42,43,44] The participation of these cardiac stem cells in myocardial performance recovery is accompanied by a complex process upon potential cells recruitment, homing, growth and differentiation. In this thesis, ethanol extract of *Rhizoma Polygoni Cuspidati* (HZE) and resveratrol (one of the active compound in *Rhizoma Polygoni Cuspidati*) were found to significantly affect the proliferation and differentiation of an embryonic cardiomyoblast cell line, H9c2. The HPLC analysis showed that HZE contains high concentration of resveratrol. *In vitro* study showed that HZE and resveratrol inhibit cardiomyoblast proliferation without causing cells injury. Treatment with HZE and resveratrol up to 5 days

induced morphological changes in the cardiomyoblast which exhibits elongation and "branching" phenotype under microscope observation. In order to understand the mechanism underlying the morphological change, we further studied the effect of resveratrol on the cellular proliferation and differentiation by cell cycle and gene expression analysis. Result of cell cycle analysis suggested that resveratrol caused G1 phase arrest dose-dependently within 9 hours of incubation. Proliferation and differentiation of H9c2 cells were further revealed by measurement of the mRNA expression of a cell cycle marker (CDK2), a differentiation marker (myogenin), and a contractile apparatus protein (MLC-2). Gene expression analysis revealed that resveratrol promoted start of cell cycle arrest but extended the myogenic differentiation progress. This finding suggests that the effect of resveratrol on cardiac differentiation may contribute to its beneficial cardioprotective effects.

Keywords: *Rhizoma Polygoni Cuspidati*; Resveratrol; cardiomyoblast; differentiation