Ligusticum Chuan Xiong Mediates Through HIF-1 alpha Suppression to Rescue the High Glucose Plus Hypoxia-induce H9c2 Cardiomyoblast Cell Apoptosis

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Abstract

In Taiwan, diabetes is growthing up and the risk of cardiovascular disease is excessively serious. Besides, trauma has the highest mortality rate in the population below 40 years old of Taiwan, and head injury and hemorrhagic shock (HS) in early time, organ failure in later period, are the major death causes of trauma. However, HS may lead sequentially to hemodynamic instability, decreases in oxygen delivery, decreased tissue perfusion, cellular hypoxia, organ damage, and death. Our previous findings indicated that diabetes mellitus has the dominant negative effect in cardiac survival pathway, while HS has the dominant positive influence in cardiac apoptosis pathway. All evidences even demonstrated the diabetic rat under trauma-induced HS, synergistically causes the myocardial cell damage. we aim to investigate if the Chuan Xiong will keep to totally rescue the synergistic H9c2 cardiomyoblast cell injury in high-glucose (HG) enhanced by hypoxia-induced HS. Heart-derived H9c2 cells were incubated in normal (22 mM) or high (33 mM) glucose medium, and transferred to a normoxic or hypoxic (<1% oxygen) condition for 36 h with post-treated presence or absence of Ligusticum for 24 h. Our result showed the HG and hypoxia caused hypoxia related proteins HIF-1α and IGFBP3 were highly increasing, and pro-apoptotic protein Bak and Bax were also increased, and up regulate downstream Caspase 9、3 result in cell death, all phenomena recovered after Chuan Xiong treatment. We intend to use this model to identify the Chuan Xiong could restore the synergistic cardiac damage induced by hypoxia-induced HS in HG treated H9c2 cardiomyoblast cells, and further to identify the possible protective mechanisms.