Molecular Mechanisms of Antiapoptotic Effects of GABA Tea on Spontaneously Hypertensive Rat (SHR) Hearts

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Background: Cardiomyocytes apoptosis is the major risk factor for the development of heart failure (HF). The purpose of this study was to evaluate the effects of GABA tea on hypertension induced cardiac apoptotic pathways in SHR.

Methods: In order to reveal the mechanisms, thirty-six male spontaneously hypertensive rats (SHR) at eight weeks of age, 200 g were divided into six groups. One group was fed water as a background control group, other rats were administered one of the following treatments: GABA tea at dose 150 and 300 mg/kg BW as LGT and HGT groups, respectively, pure GABA at dose 150 and 300 mg/kg BW as LG and HG groups, respectively , green tea(GT) as control of LGT and HGT groups. After 12 weeks, cardiac tissues were analyzed by histological analysis, western blotting and TUNEL assays.

Results: GABA tea, green tea and pure GABA, decreased hypertension-induced cardiac abnormalities, including abnormal myocardial architecture, enlarged interstitial spaces, and more cardiac TUNEL-positive apoptotic cells. In addition, GABA tea ,green tea and pure GABA, decreased protein levels of Fas ligand, Fas death receptors, FADD, Bax and Bak, and dramatically increased anti-apoptotic proteins, Bcl2. Further more GABA tea green tea and pure GABA also decreased activated-Caspase8, activated-caspase 9 and activated-caspase 3. Additionally, the expressions of IGF-I and PI3K/Akt pathway, maintaining the survival to cardiomyocytes were also upregulated. All of the above result, LG and green tea anti-apoptotic and pro-survival effects showed the best. Conclusion: The cardioprotective effect of GABA tea green tea and pure GABA can be attributed to not only antioxidant and antihypertensive properties but also improvement of the cardiomyctye apoptosis by induced hypertension.