Changes of blood pressure, visceral fat tissue and gene in fetal programming induced rat model after Cozaar XQ treatment

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Purpose: The purposes of this study were to investigate the effects of fetal under-nutrition during pregnancy and lactation on blood pressure, visceral fat, and several genes and evaluate changes after Cozaar XQ treatment. Methods: Pregnant rats were studied from the 10th day to term gestation and through lactation. The rats were divided into three groups: the control (C) group and study group The study rats were put on a 50% food restricted diet (FR). The study rats were further divided into the FR group and Cozaar XQ (CX) group, which was treated with Cozaar XQ after birth. Serum lipid profiles and glucose were determined in offspring at 1, 2, 3, 4 and 5 months. Masson’s Trichrome staining was performed in order to observe the degree of fibrosis in the heart tissues. The amount of abdominal visceral fat was measured in the offspring. Microarray analysis was performed in visceral fat tissues. Western blot analysis regarding five genes such as endothelin(ET)-1, ACE (angiotensin converting enzyme), angiotensin II receptor type IA (ATIA), troponin (Tn) I and endothelial nitric oxide synthase (eNOS) were performed.

Results: Blood pressure and body weight were significantly higher in FR group in the 5 month old FR group compared with the C group and significantly lower in CX group compared with the FR group. The amount of visceral fat was significantly higher in the 2, 4 and 5 month old FR group compared with the C group and significantly lower in CX group compared with the FR group. Fat acid synthase, leptin, ET, angiotensinogen, ET receptor A, adiponectin, carnitine palmitoyltransferase-1 and insulin-like growth factor binding protein-3 genes were significantly expressed in visceral fat by microarray analysis. Expressions of ACE, ATIA, Tn and eNOS proteins in the CX group were lower than FR group at 5 month.

Conclusion: Fetal under-nutrition only during pregnancy resulted with obesity, high blood pressure and gene changes in offspring. Cozaar XQ treatment prevented obesity, hypertension and gene changes.