Poster Number 15

Abstract 0240_0346_000014

Resveratrol supplementation prevents maternal glucose intolerance and gestational diabetes-induced cardiac hypertrophy in the rat offspring

Gabriel Brawerman, CHRIM, University of Manitoba; **Stephanie Kereliuk**, CHRIM, University of Manitoba; **Troy Pereira**, CHRIM, University of Manitoba; **Bo Xiang**, CHRIM, University of Manitoba; **Mario Fonseca**, CHRIM, University of Manitoba; **Vernon Dolinsky**, CHRIM, University of Manitoba

Background:

Gestational diabetes mellitus (GDM), which affects 5-10% of pregnancies, is characterized by hyperglycemia in the third trimester of pregnancy. GDM increases cardio-metabolic disease risk in the offspring. Resveratrol (RESV) is an anti-oxidant, but less is known about its effects during pregnancy.

Objective:

To determine whether dietary RESV supplementation (~150mg/kg/day) to pregnant rats during the third trimester of pregnancy and lactation will improve maternal glucose tolerance and prevent GDM-induced heart disease in the offspring.

Methods:

Female Sprague-Dawley rats consumed a high fat and sucrose (HFS) diet (45% kcal fat) for 6 weeks and then mated to induce GDM, while lean control females received a low fat (LF) diet (10% kcal fat). At the beginning of the third trimester, a subgroup of pregnant HFS-fed females were supplemented with RESV (150 mg/kg body weight). After weaning, offspring received LF or HFS diets for 12 weeks. Cardiac function and morphometry were determined by echocardiography. To assess mechanisms, fetal cardiomyocytes were isolated and immunoblotting was performed.

Results:

RESV supplementation prevented maternal glucose intolerance caused by GDM ($p<0.05$). In fetal offspring, RESV prevented GDM-induced cardiac hypertrophy ($p<0.05$). At 15 weeks of age, left ventricular posterior wall thickness was reduced in the GDM+RESV offspring to a similar level as the Lean offspring when compared to the GDM offspring ($p<0.05$). Parameters of systolic and diastolic function were similar in all groups. Immunoblotting of heart tissue showed a reduction in the mTOR signalling in the GDM+RESV offspring, consistent with reduced hypertrophy of the myocardium. Fetal cardiomyocytes from GDM offspring exhibited increased superoxide production (1.22-fold, $p<0.05$) that was attenuated in cardiomyocytes from GDM+RESV offspring.

Conclusion:

Maternal RESV supplementation during the third trimester of pregnancy and lactation prevented GDM-induced maternal glucose intolerance and prevented cardiac hypertrophy in the offspring, potentially by reducing reactive oxygen species production and the mTOR signalling pathway that controls cardiomyocyte hypertrophy.