

**Lucyna J. Wojcik**  
High School  
Isidore Newman School, New Orleans, Louisiana

Dr. Xinping Yue, MD, PhD  
Cardiovascular Center of Excellence, LSU Health Sciences Center, New Orleans, LA

**“Female Mouse Model to Investigate Effects of High Fat Diet on Blood Pressure Prior to Pregnancy”**

**Background:** Women of reproductive age often consume calorie-dense foods, which contributes to the development of adipose tissue. It has been reported that increased adipose tissue correlates with greater formation of angiotensin II-converting enzymes, which stimulates the renin-angiotensin system (RAS) to produce greater levels of angiotensin II. The hormone angiotensin II acts as a vasoconstrictor to increase blood pressure and cardiac output, which contributes to hypertension. Therefore, diet-induced obesity may be a risk factor for hypertension. In order to test this hypothesis, this study utilizes a mouse model, wherein diet can be tightly controlled, to analyze whether a high fat diet induces hypertension in female mice prior to pregnancy.

**Objectives:** This study analyzes the relationship between high fat diet and blood pressure in pre-pregnancy adult female mice.

**Methods:** At 6 weeks of age, a cohort of 10 C57BL/6J female were placed on a high fat diet (HFD) of 60 kcal% fat of mouse chow, while—at the same age—another cohort of 10 C57BL/6J female mice were fed a regular diet (RD) of 22 kcal% fat. After 5 weeks on their respective diets, systolic blood pressure (SBP) measurements were taken with the CODA High Throughput System from Kent Scientific Corporation to assess hypertension. A SBP measurement  $\geq 130$  mmHg was considered hypertensive. This study assessed SBP readings from week 5 to week 10; in addition, body weight changes were monitored weekly. Statistical comparisons between the HFD and RD mice were made with two-tailed t-tests at a 95% confidence level ( $\alpha = 0.05$ ).

**Results:** The mean SBP measurements of HFD mice remained consistently higher than the SBP measurements of RD mice. As compared with the female RD mice, the female HFD mice exhibited the greatest statistical difference in SBP measurements during week 9 with a P value  $< 0.0001$  and a mean difference of  $27.23 \pm 5.18$  mmHg (SBP in RD group:  $122.1 \pm 3.8$  mmHg; SBP in HFD:  $149.3 \pm 3.5$  mmHg). HFD mice displayed the least statistical difference in SBP measurements during week 6 with a P value of 0.7070 and a mean difference of  $3.38 \pm 8.85$  mmHg. When all of the mean SBP measurements from HFD and RD mice throughout the 6 weeks were compiled, SBP measurements from HFD mice were statistically higher than SBP measurements of RD mice with a P value  $< 0.0001$ . The SBP measurements of RD mice were never significantly higher than the SBP measurements of HFD mice. However, out of the 15 sessions of recordings, 8 sporadic sessions exhibited insignificant differences between the mean SBP measurements of RD mice and HFD mice. As compared with the method of telemetry, the CODA High Throughput System most likely placed excess stress on the mice, which elevated all BP measurements.

**Conclusions:** The data from this study supports an association between HFD and hypertension in female mice. The effects of HFD on the blood pressure of pregnant female mice and their progeny will be further investigated in the future.