

Consumption of a High-Fat Meal Alters Post-Prandial SIRT mRNA Expression in Blood Leukocytes

Best Sampson JN¹, Henning AS¹, Prado EA¹, Venable AS¹, Padilla PA², and McFarlin BK¹

¹Applied Physiology Laboratory; ²Department of Biological Sciences; University of North Texas; Denton, TX

Category: Doctoral

Advisor / Mentor: McFarlin, Brian (Brian.McFarlin@unt.edu)

ABSTRACT

Introduction. Sirtuins (SIRT) are protein deacetylases, hypothesized to regulate the transcription of various genes involved in the prevention of atherogenesis and diet induced obesity. Previous research from our laboratory has demonstrated that consumption of a single, high-fat meal increases various CVD risk factors for up to 5-h post-prandial. Given the importance of SIRT to metabolic disorders, it is reasonable to speculate that a single, high-fat meal also disrupts SIRT.

Methods. The purpose of this study was to determine the effect of a high-fat meal (75% of daily kcals & 80% of daily fat needs), on SIRT mRNA expression in blood leukocytes during a 5-h post-prandial period. Men and women (N=17) were recruited to report to the lab following an overnight fast. Venous blood samples were collected prior to the meal, 1, 3, and 5-h post-meal. White buffy coat aliquot was frozen in RNALater solution. At the end of the study samples were thawed and RNA was isolated using a phenol/chloroform method. RNA was reverse transcribed and mRNA expression for SIRT 1-7 was determined using a Taqman qPCR technique with 18S rRNA as a normalizer, under standard PCR cycling conditions. An additional aliquot of serum was used to measure triglyceride, total cholesterol, and glucose responses were measured using enzymatic assays on an automated chemistry analyzer (ChemWell T; P.C., FL). Data was analyzed using a RM ANOVA with $P < 0.05$. **Results.** Consistent with previous results, the meal caused an increase in triglycerides, total cholesterol and glucose that reached peaked values at 3-h post-prandial. We also observed significant expression changes in the mRNA of the SIRT 1 ($P=0.02$) and SIRT 6 ($P=0.03$) during the 5-h post-prandial period. Both SIRT 1 and SIRT 6 showed the greatest decreased expression at 3-h post-prandial compared to baseline, 51.8% and 46.2% respectfully. **Conclusion.** To our knowledge, this is the 1st study to report that consumption of a high-fat meal transiently alters SIRT mRNA expression consistent with changes in serum triglyceride and glucose concentration. More research is needed to understand how transient, post-prandial changes in SIRT mRNA expression contribute to increased disease risk.