of examination. Further research and examination of theoretical and/or model framework usage amongst gerontology research will help determine the validity of these results.

**METABOLIC CROSS-TALK BETWEEN ER, MITOCHONDRIA, AND NUCLEUS: POSSIBLE IMPACT IN AGING**
I.A. Dieterich, Q. Yu, K. Overmyer, J. Coon, L. Li, L. Puglielli, Neuroscience Training Program, University of Wisconsin, Madison, Madison, Wisconsin

Ne-lysine acetylation in the lumen of the endoplasmic reticulum (ER) regulates quality control and proteostasis within the secretory pathway. Mechanistically, it has been established that the import of acetyl-CoA into the ER lumen by the membrane transporter AT-1/SLC33A1 is an essential biochemical component of the ER acetylation machinery. Homozygous mutations in AT-1 are associated with developmental delay and childhood death while heterozygous mutations are associated with a familial form of spastic paraplegia. Finally, gene duplications of AT-1/SLC33A1 have been identified in patients with autistic-like features, intellectual disability and dysmorphic features that are consistent with a diagnosis of segmental progeria. Neuron-specific overexpression of AT-1 in the mouse leads to an autistic-like phenotype while systemic overexpression leads to a progeria-like phenotype that mimics an accelerated form of aging. While dissecting the phenotype of these mice, we discovered the influx of acetyl-CoA into the ER causes epigenetic and mitochondria adaptation. In light of the strong relationship between mitochondria biology and TCA engagement with aging and several age-associated diseases, we decided to use a combination of proteomic and metabolomic approaches to dissect the biochemical and molecular mechanisms that mediate the metabolic and functional adaptation of the mitochondria in the above progeria-like animals. These studies were paralleled by ex vivo genetic approaches to identify novel key regulatory elements. The results show that ACLY, SLC13A5 and SLC25A1 are essential in maintaining acetyl-CoA flux within the cell and a functional cross-talk between the ER and the mitochondria.

**CHILDHOOD DISADVANTAGE AND METABOLIC SYNDROME: AN EXAMINATION OF GENDER AND HEALTHY LIFESTYLES**
C. Lee1, V. Tsenkova1, J. Boylan2, C.D. Ryff1, 1. University of Wisconsin-Madison, Madison, Wisconsin, 2. University of Colorado-Denver, Denver, Colorado

Objectives: We investigate (a) the extent to which healthy lifestyles (physical activity and diet) explain the association between childhood disadvantage and metabolic syndrome (MetS) in midlife, and (b) whether there are gender differences in the associations.

Methods: Data on 1,054 respondents came from the Biomarker Subsample of the Midlife in the U.S. Study. Childhood disadvantage was measured with four indicators: parental education, parental occupational prestige, financial level growing up, and welfare status. MetS is the total number of MetS symptoms defined by the National Cholesterol Education Program. Physically intense activities (> 500 metabolic equivalent minutes per week) were categorized into three domains: leisure, work, and chores. Food consumption consists of two domains: healthy foods (fruits/vegetables, whole grains, fish, lean meat, non-meat protein) and unhealthy foods (sugary beverages, fast food, high-fat meat).

Results: After adjusting for life course confounding factors, individuals who were disadvantaged in childhood are less likely to participate in physically intense leisure activities with a stronger association for women after adjusting for adult SES. The association between childhood disadvantage and diet, however, appears stronger for men. Compared to advantaged men, those who were disadvantaged in childhood tend to consume more unhealthy food. In the association between childhood disadvantage and MetS, leisure activity is a significant mediator for women; unhealthy food consumption is a significant mediator for men.

Conclusions: Disadvantages in early life shape healthy lifestyles in adulthood. Life-course perspectives and gender-specific approaches are important for behavioral interventions to improve the cardiometabolic health of adults.

**EFFECTS OF TAI CHI CHUAN ON IMMUNE AND INFLAMMATORY MAKERS OF ELDER WITH AND WITHOUT DIABETES**
K. Yang1,2, W. Chang1, H. Chuang3, S. Yeh2, 1. Mackay Memorial Hospital, Taipei, Taiwan, 2. Mackay Medical College, New Taipei City, Taiwan, 3. Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan, Taiwan

Background: We have previously shown that moderate exercise of Tai Chi Chuan exercise could increase complement factor H with a decrease of factor B as a proteomic biomarker of Tai Chi Chuan exercise (Clin Chem. 2010;56:127–31.), and diabetic patients with different complications have varied proteomic markers (J Diabetes Metab Disord. 2016;15:24.). This study has further analyzed whether a 12-week program of Tai Chi Chuan exercise improves the inflammatory markers of type 2 diabetes mellitus (T2DM) patients in comparison to aged matched normal elders.

Methods: Plasma low abundance proteins were enriched by depletion of 14 high abundance proteins by an affinity removal system, and subjected to nanoflow liquid chromatography electrospray ionization (nano LC-ESI) mass spectrometry after a gel electrophoresis with in-gel digestion for 8 pairs of plasma from normal elders and T2DM. The plasma differential proteomes between normal adults (n=20) and diabetic patients (n=24) before and after a 12-week Tai Chi Chuan exercise were validated by enzyme-linked immunoassay (ELISA).

Results: A total of 826 proteins in plasma were consistently identified from 8 plasma samples of normal adults, and 817 were consistently identified in 8 plasma samples of T2DM patients. Using the MetaCore analysis, we found the low abundance proteins in plasma between normal adults and T2DM patients were significantly different in 5 functional pathways. We next selected the 6 proteins (DPP4, PIP, NGAL, L1CAM, THBS2, and GLP1) associated with metabolism or inflammation for validation by enzyme-linked immunoassay. We found that PIP, THBS2, L1CAM and NGAL levels were significantly (p<0.013, Bonferroni correction adjust) higher in T2DM patients than in normal adults. Interestingly, Tai Chi Chuan exercise significantly (p=0.04)