Dietary Intake: Obesity Phenotype and Type 2 Diabetes (T2MD) in Youth

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Adults who have high carbohydrate intake are at increased risk for having obesity, specifically central obesity, and T2DM. While obesity is associated with T2DM in adolescents, the role of high carbohydrate intake and central adiposity in T2DM adolescents is unclear. To address this issue, we compared carbohydrate intake using a three day diet record collected in 501 youth (female 323, male 178; non-Hispanic white 181, non-white 320; age range 10-23 years,) divided into lean controls (198; BMI $<85^{th}$ percentile by CDC criteria), obese controls with no known disease (175; BMI $\geq 95^{th}$ percentile), and obese individuals with T2DM (128). T2DM was defined as the presence of diabetes (fasting plasma glucose >126 mg/dl or random plasma glucose > 200) and negative serum islet cell antibody titers (glutamic acid decarboxylase, insulinoma antibody – 2, insulin autoantibodies). Dietary data was collected from two weekdays and one weekend day. To reduce within subject variance and allow more accurate quantification of individual nutrient intake (Nutrient Data System of Research for coding analysis), the average intake was calculated. Waist circumference was measured at the umbilicus. Chi-square, analysis of Variance and Covariance and correlation were used for analysis. Obese T2DM and obese controls did not differ by overall adiposity as measured by BMI-Z or central adiposity as measured by waist circumference. Total carbohydrate intake was significantly lower in obese T2DM (202 grams/day) compared to obese (232 grams/day) and lean (253 grams/day) controls ($p<0.0001$). Although carbohydrate intake was inversely related to BMI-z (-0.11, $p<0.009$) and waist circumference (-0.15, $p<0.0007$) overall, this association was not found within lean, obese or obese T2DM groups. We conclude that the phenotype of adiposity, overall or central, does not differentiate between youth with and without diabetes. Contrary to adults with obesity or T2DM, high carbohydrate intake is not associated with the presence of overall or central adiposity or T2DM in youth.