Abstract

Carbohydrate (CHO) Intake and Quality during Adolescence and Association with HOMA2-IR in Adulthood—The Role of the Chronotype †

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Abstract: Background/objectives: Adolescence is associated with two risk markers of Type 2 Diabetes Mellitus (T2DM): insulin resistance and lateness in chronotype. Hence, negative eating behavior during adolescence may increase the future risk of T2DM. We investigated the prospective relevance of carbohydrates (CHO) from high GI sources consumed in the morning and in the evening during adolescence for HOMA2-IR in young adulthood and the role of chronotypes. Methods: Examinations of subjects were performed at the DONALD study centre. Participants provided at least two 3-day weighed dietary records (median = 7 records) during adolescence and one blood sample in young adulthood. CHO quality was classified as low (<55) and moderate (≥55) according to the Glycemic Index. Chronotype was assessed with the Munich Chronotype Questionnaire and defined as age- and sex-adjusted midpoint of sleep on free days corrected for sleep debt on workdays (MSFsc) using all measurements from adolescence up to young adulthood. HOMA2-IR was defined by fasting insulin and glucose measures. Multivariable regression analyses (including, e.g., age, sex, BMI-SDS, physical activity and energy) assessed the longitudinal associations of interest. Results: A total of N = 224 (♀n = 58%) participants with a median (Q1:Q3) age of 12 (12:13) yrs during adolescence and 22 (18:26) yrs at blood withdrawal were included. Only the residual of adolescent CHO consumption in the morning (<11:00 hh:mm) was significantly, inversely associated with adult HOMA2-IR (lsmeans HOMA2-IR T1: 2.96 (2.41–3.55) vs. T3: 1.95 (1.54–2.41), p for trend = 0.01). Discussion: Our data suggest that the consumption of CHO in the morning decreases HOMA2-IR independent of chronotype.

Keywords: carbohydrates; glycemic index; adolescents; chronotype; type 2 diabetes mellitus

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**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data of the DONALD study is available upon reasonable request to epi@uni-bonn.de.

**Conflicts of Interest:** Anette Buyken is a member of the International Carbohydrate Quality Consortium (ICQC), and a co-author of the popular cookbook “Nordisch abnehmen”.

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