

ORIGINAL RESEARCH COMMUNICATION

The 24-h carbohydrate oxidation rate in a human respiratory chamber predicts ad libitum food intake^{1,2,3}

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Background: The 24-h respiratory quotient (24-h RQ) and 24-h carbohydrate balance (24-h CHO-Bal) are predictors of weight change. Whether these relations are mediated by the effects of substrate oxidation and balance on food intake is not known.

Objective: We tested whether substrate oxidation and balance predict future ad libitum food intake.

Design: Substrate oxidation and balance were measured in a respiratory chamber in 112 normoglycemic subjects (83 Pima Indians and 29 whites; 67 men and 45 women) in energy balance for 3 d before tests were performed. The subjects then self-selected their food ad libitum for the following 3 d.

Results: The 24-h RQ, 24-h carbohydrate oxidation (24-h CHO-Ox), and 24-h CHO-Bal in the respiratory chamber predicted subsequent ad libitum food intake over 3 d (as a percentage of weight maintenance energy needs; %EN-WM). The 24-h CHO-Ox explained 15% of the variance in %EN-WM. The weight change over the 3-d ad libitum period was associated positively with 24-h CHO-Ox and negatively with 24-h CHO-Bal in the chamber; these associations were no longer significant after adjustment for %EN-WM.

Conclusion: Carbohydrate oxidation and balance predict subsequent ad libitum food intake and can influence short-term weight changes, which indicates that carbohydrate balance is a contributing metabolic factor affecting food intake.

Key Words: Substrate oxidation • nutrient balance • food intake • body weight regulation

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