

How Resting Metabolism Impacts Total Caloric Burn

Background: While individuals often measure “caloric burn” from exercise and physical activity, caloric burn from resting metabolism is largely unknown. The question is: how important is this unknown factor in assessing an individual’s total daily caloric burn? To answer this question, a study was conducted to measure the energy expenditure of sedentary individuals who engaged their routine activities (e.g., driving, walking, sleeping) using Breezing™ metabolism tracker and, in parallel, a reference instrument, the Oxycon Mobile. Both instruments showed that, on average, resting metabolism counts for **85% of daily caloric burn** for these sedentary subjects.

Study description

The routine activities of each subject were recorded and grouped into seven categories: office work, laboratory bench work, driving, walking, watching TV, (other) leisure, and sleep. Time spent on each activity is shown in **Fig. 1A** for 6 of the study subjects.

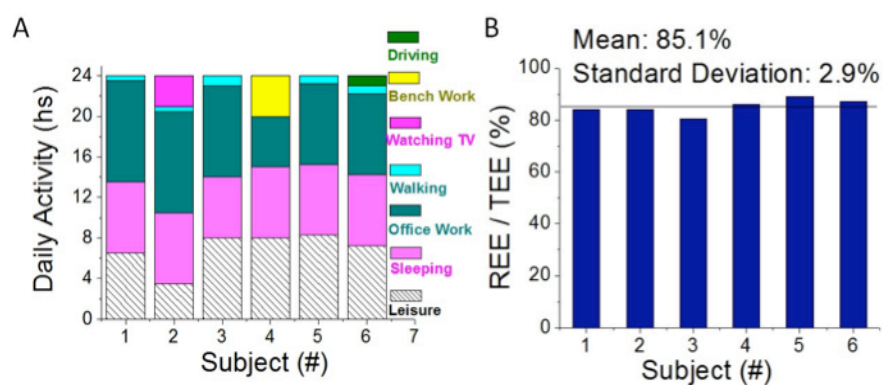


Figure 1. (A) Time spent on different activities for 7 subjects. **(B)** Percentage of energy expenditure due to resting metabolism (REE/TEE) in the total energy expenditure (TEE).

Next, the unique calorie burn—or, energy expenditure—of each activity (EE_i) was measured and recorded for each subject, and each subject’s total daily energy expenditure (TEE) was calculated using formula $TEE (kcal/day) = \sum x_i EE_i$, where x_i is the fraction of time spent on each activity [1]. Finally, the resting metabolism (REE) of each individual was measured, and the ratios of REE to TEE for different subjects are displayed in **Fig. 1B**.

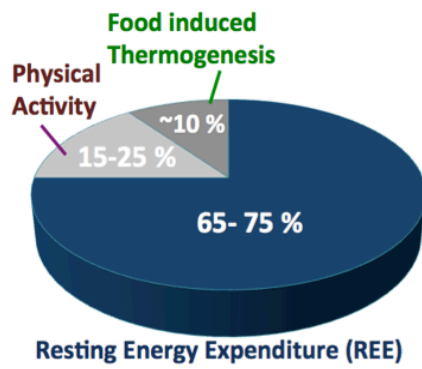
Results and conclusions

The study showed that REE constituted ~85% of TEE for the sedentary subjects, on average (**Fig. 1B**). Furthermore, REE made up a greater percentage of TEE in sedentary individuals than in active individuals (**Fig. 2**). This finding underscores the importance of measuring resting metabolism to accurately determine total caloric burn.

One possible method to increase resting metabolic rate is by incorporating high-intensity interval training (HIIT). For more details about HIIT and resting metabolism, see Application Note No. 104.

Active Lifestyle

Several hours of physical activity each day



Sedentary Lifestyle

Little (if any) daily physical activity

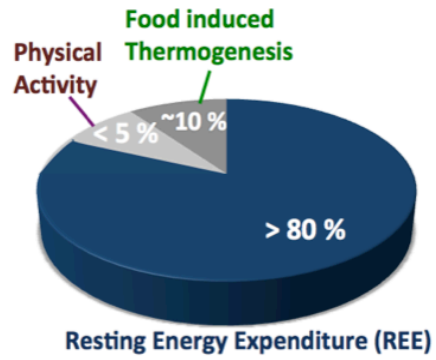


Figure 2. Total energy expenditure of active and sedentary individuals: comparison of Resting Energy Expenditure (REE), physical activity, and food-induced thermogenesis.

References

- [1] W. D. McArdle, F. I. Katch, and V. L. Katch, "Exercise Physiology: Energy, Nutrition, & Human Performance," *Lippincott Williams & Wilkins*, 2007.