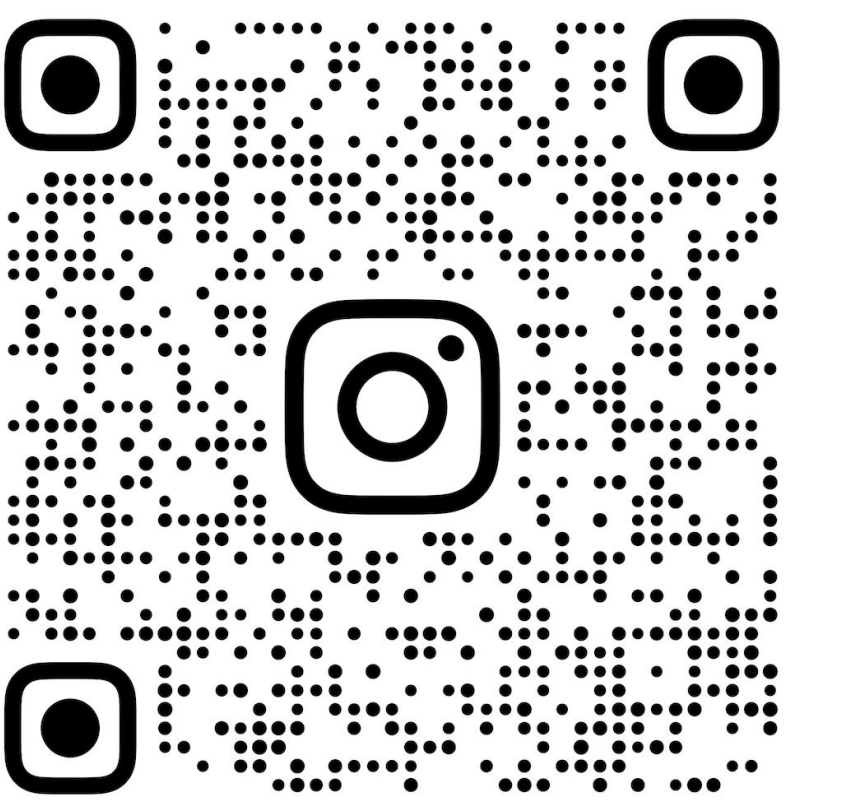


# Aerobic scope and muscle physiology: how do metabolic rates change in response to strength training?



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Mirielle Kingsley | Department of Biology | Providence College | Providence, Rhode Island

Metabolic rates are a way of quantifying the cumulative energy flow required to sustain all of life's catabolic and anabolic processes.

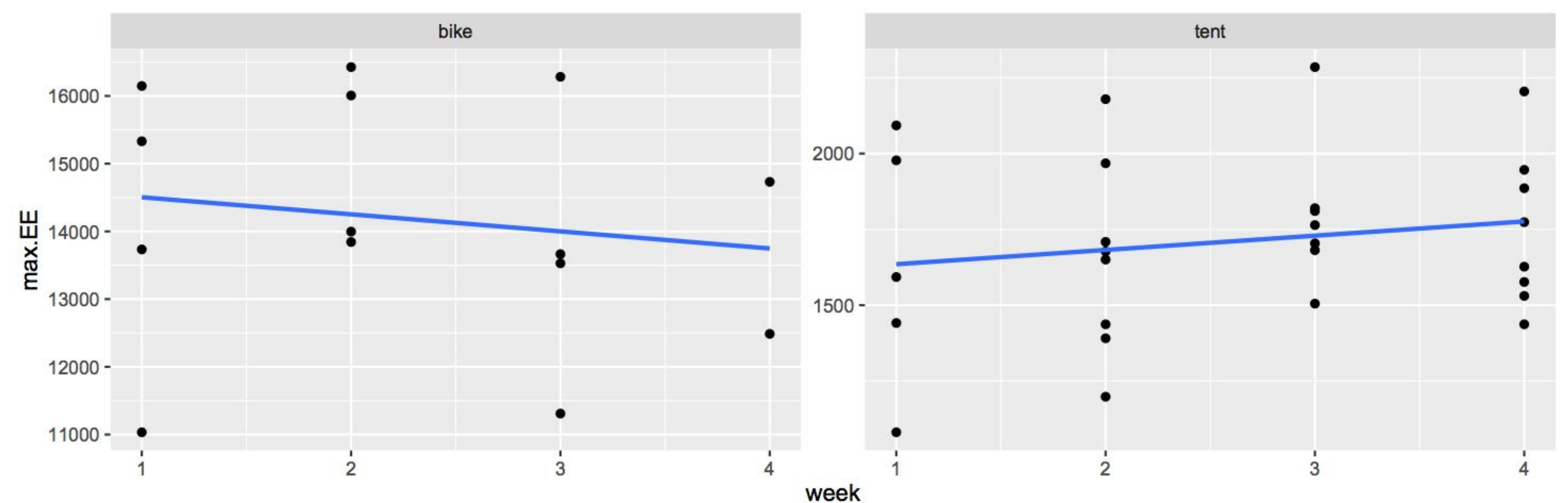
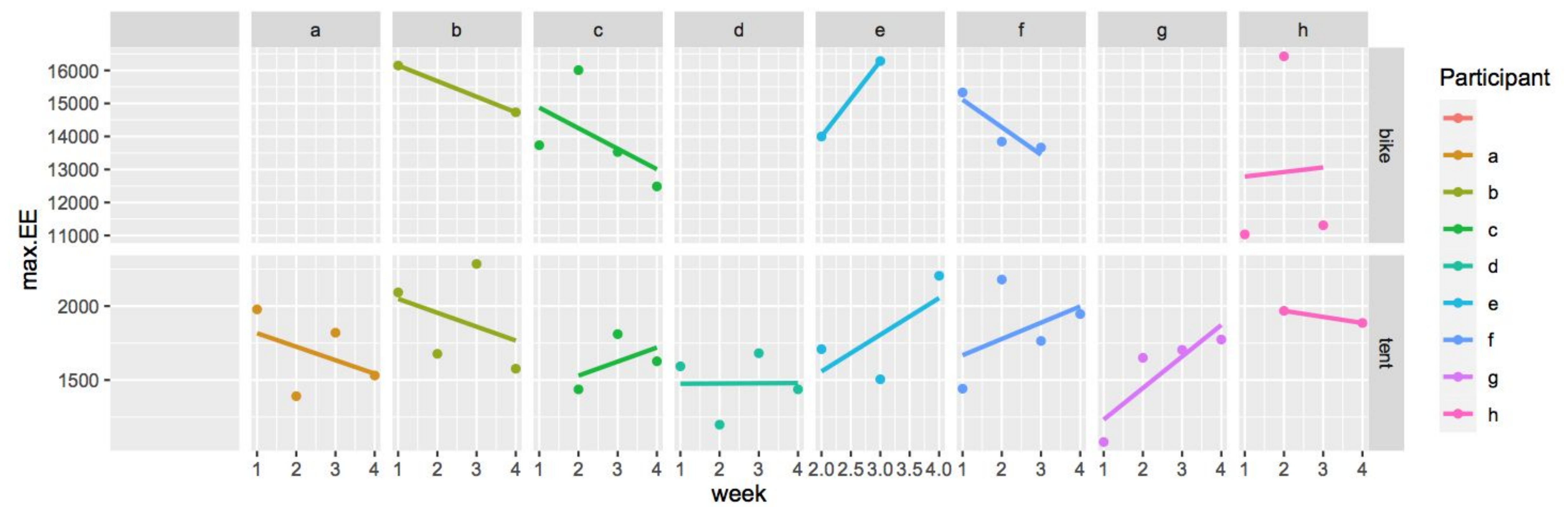
Although many apps and devices estimate metabolic rates, and despite how important metabolism is for health, very few empirical methods exist to directly measure or test hypotheses about human metabolism.



The Apollo system measures oxygen consumption as a way of calculating energetic expenditure.

To test these questions, we recruited participants from the PC Women's Ice Hockey team to measure their metabolic rates using flow-through respirometry.

The metabolic rates of participants were measured twice a week (at rest and while exercising) every week for a month as they engaged in structured strength training.



If strength training builds muscle mass, and muscle is metabolically demanding tissue, we hypothesized that resting metabolic rates should go up over time. We did not know whether aerobic scope ( $\text{Max VO}_2 / \text{Resting VO}_2$ ) would increase or decrease as a result of the training.

Individual variation among participants was much greater than any average trends for the whole group. In some cases, baseline metabolic rates measured in the tent increased by a substantial 30-50%, but bike measurements were challenging to consistently maintain peak exertion and participants experiencing injury (unassociated with the measurements) were unavailable.



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