The following letter is in response to the Point:Counterpoint: “Lactic acid accumulation is an advantage/disadvantage during muscle activity” that appeared in the April issue (http://jap.physiology.org/content/vol100/).

To the Editor: Although the “received wisdom” is that an exercise-induced lactacidosis should impair subsequent exercise performance, such is not consistently the case. In recent work, we used exercise-induced elevations in blood [lactate] to alter the pulmonary oxygen uptake (V\(_\text{O}_2\)) response to high-intensity exercise, following from the work of Gerbino et al. (3). In doing so, we also addressed the influence of such protocols on exercise performance. Our findings demonstrate that prior heavy exercise [performed above the “lactate threshold” (LT)] followed by 10 min of passive recovery, resulting in a mild increase in blood [lactate] at exercise onset (“baseline” blood [lactate] \(\sim 3.0\) mM), substantially improves time to exhaustion during a subsequent bout of exhaustive exercise (by 30–60%; Ref. 4). Moreover, follow-up work measuring changes in mean power output during a 7 min “performance trial” demonstrated that both prior moderate exercise (below LT, baseline blood [lactate] \(\sim 1.0\) mM) and prior heavy exercise (baseline blood [lactate] \(\sim 3.0\) mM) increased performance by 2–3% in well-trained cyclists (2). In contrast, prior sprint exercise (baseline blood [lactate] \(\sim 6.0\) mM) led to a nonsignificant 1.8% reduction in performance. In agreement with the work of Bangsbo et al. (1) repeated bouts of sprint exercise (baseline blood lactate \(\sim 7.7\) mM) reduces time to exhaustion during subsequent exercise (5). It would seem, therefore, that the performance of prior heavy exercise improves exercise performance despite (because of?) mild elevations in blood [lactate], but that more intense prior activity is disadvantageous.

REFERENCES

Mark Burnley
Department of Sport and Exercise Science
University of Wales, Aberystwyth
Aberystwyth, Ceredigion, United Kingdom
e-mail: mhb@aber.ac.uk

Daryl P. Wilkerson
Andrew M. Jones
School of Sport and Health Sciences
University of Exeter
Exeter, United Kingdom