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Peer reviewed

letters to the editor

Evidence for a threshold relationship between lactate efflux and intracellular PO₂

To the Editor: Recently, Connett, Gayeski, and Honig (2) presented the results of a study entitled "Lactate efflux is unrelated to intracellular PO₂ in a working red muscle in situ." Since the major thrust of their paper was a challenge to the concept that lactate accumulation is related to O₂ availability in mammalian cells, I was surprised that the authors did not plot the crucial relationship of lactate efflux as a function of muscle PO₂. I performed this analysis from their data using the median values for intramuscular PO₂ (their Fig. 2B) and lactate efflux (their Fig. 2A). The resulting plot is shown on the right.

In striking contrast to the title and conclusions of the paper, their data demonstrate a threshold relationship between lactate efflux and intracellular PO₂ occurring at ~8 Torr. Moreover, this is remarkably similar to the work of Bylund-Fellenius et al. who demonstrated a threshold phenomenon for the intramuscular lactate-to-pyruvate ratio as a function of intramuscular PO₂ in exercising human subjects (1). I believe that the data presented by Connett and co-workers (2) are consistent with the existence of a threshold of lactate efflux from cells which is related to PO₂; their data, therefore, support the concept of the anaerobic threshold. Finally, the critical PO₂ below which O₂-dependent processes cease is a function of the mitochondrial PO₂ (not measured in the article) and not solely dependent on the cytosolic PO₂.

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