LETTER TO THE EDITOR

Comment on the Paper of J. M. Metzger and R. L. Moss: "Shortening Velocity in Skinned Fibers"

Dear Sir:

A recent paper by Metzger and Moss (1) reported the influence of filament spacing on unloaded contraction speed of skinned fibers from rats. Although their main results nicely confirmed the previous findings and conclusions of Gulati and Babu (2) on osmotically compressed intact fibers from frogs, the authors expressed reservations on the conclusions. But somehow they disregarded the fact that the Gulati–Babu paper had already addressed and eliminated these possible reservations.

Gulati and Babu showed that the unloaded speed (V_{max}) of intact fibers is decreased with sucrose (see also references 3 and 4). But since the osmotic compression in these experiments is necessarily associated with a marked increase in intracellular ionic strength, Gulati and Babu had devised new experiments to separate the effects of compression of interfilament spacing from the effects of salt. The experimental strategy utilized the Boyle–Conway principles (5–7) and the fibers were activated by a temperature jump technique. Accordingly, each increment in osmotic pressure with sucrose was paired with an identical increase with KCl to serve as the control (2, 8). The sucrose addition both compressed the fiber and caused an increase in intracellular ionic strength. The KCl addition increased only the ionic strength. To stress the critical importance of this control, all the results in Gulati and Babu were displayed in pairs (see Figs. 1, 4, 5, 6, and 7 in reference 2). After appropriate corrections for the KCl results did Gulati and Babu reach the conclusion that the reduction in V_{max} with sucrose in intact cell could be primarily attributed to osmotic compression of the interfilament spacing. Conclusions reported in this volume by Metzger and Moss are essentially the same.

Thus their skinned fiber results are most notable in that these confirmed the findings of Gulati and Babu on intact fibers.

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ARVIND BABU
Division of Cardiology
Albert Einstein College of Medicine
Bronx, New York 10461

The editors' offer to respond was declined by R. L. Moss.