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Effect of the Tn-Tm System on Contraction and Relaxation Processes in Glycerinated Muscle Fiber*

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The effect of the Tn-TM system on contraction and relaxation was examined when Ca^{2+} and Mg^{2+} -ATP were added to glycerinated muscle fiber. Test solutions used for the Ca^{2+} - and Mg^{2+} -contraction were designated as Ca^{2+} and Mg^{2+} -ATP solutions, respectively. These solutions contained 0.1 mM Ca^{2+} in the former, and 4 mM Mg^{2+} and 2 mM ATP in the latter, and had pH 6.8. Each solution could be quickly exchanged with the other in a small chamber. Ca^{2+} -contraction tension was measured in Ca^{2+} solution after the fiber was treated with Mg^{2+} -ATP solution, and Mg^{2+} -contraction was observed in Mg^{2+} -ATP solution after conditioning in Ca^{2+} solution and then 0.1 mM EGTA solution. The rate of rise of Mg^{2+} -contraction was faster than that of Ca^{2+} -contraction. Consequently, the relaxation between rate of rise and pCa^{2+} in Mg^{2+} -contraction shifted toward the Ca^{2+} -sensitive direction compared to Ca^{2+} -contraction. Furthermore, after the contracted fiber relaxed in EGTA and Mg^{2+} -ATP solutions, release of actomyosin from the rigor was also regulated by the Tn-TM system.

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