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Ca²⁺-insensitive Contraction in Glycerinated Skeletal Muscle Fiber Treated with Additional Troponin T*

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An investigation was carried out on the effect of troponin T (TnT) protein on the Ca²⁺-sensitivity of fiber contraction when it was added to glycerinated muscle fiber. The TnT-treated fiber was observed to lose its Ca²⁺-sensitivity, so that it was seen to contract even in a Ca²⁺ free buffer solution. However, the treated fibers were not significantly different from the normally glycerinated ones in terms of tension magnitude.

On the other hand, the fiber did not lose its Ca²⁺-sensitivity upon treatment in a similar manner with troponin I (TnI) or troponin C (TnC) protein instead of TnT; the tension magnitude was seen to decrease only with TnI treatment.

SDS-PAGE patterns of the TnT-treated fibers were different from those of glycerinated ones at the TnI and TnC bands, which were fainter in the TnT-treated fibers than in the normal-ones. DACM-labeled fibers also decreased in the DACM-labeled TnI and TnC proteins on gel as the result of the treatment with TnT protein. Further, those proteins were completely removed from fibers into extra medium.

These findings suggest that either the additional TnT protein removes TnI and TnC subunits from the Tn complex combined with thin filaments in the fibers, or that it exchanges the total Tn complex on the thin filaments.

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