

Structure and molecular organisation of the sarcoplasmic reticulum of skeletal muscle fibers*

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SUMMARY

Activation of muscle contraction is a rapid event that is initiated by depolarization of the plasma membrane and transverse (T) tubules, which following transduction in the interior of the muscle cell, activate the release of calcium from the sarcoplasmic reticulum (SR). Pioneer studies using electron microscopy defined the organization of the sarcoplasmic reticulum and the details of the junctions between sarcoplasmic reticulum and T tubules, which are essential for translating the electrical signal on the plasma membrane to calcium release from the sarcoplasmic reticulum. Molecular biology and biochemistry studies have revealed the presence of several proteins located on the sarcoplasmic reticulum, some of which participate together with the ryanodine receptors to the assembly of a large multi-protein complex, while others, like the calcium pumps, have independent localization and activities. As a whole, the current view of this system contemplates the existence of a high level of structural organization in the sarcoplasmic reticulum with respect to the localization of ryanodine receptors and other proteins. In this review we shall summarize studies on the expression and possible functional significance of the ryanodine receptor type 3 in mammalian skeletal muscles and recent studies aimed to dissect the mechanisms that establish the organization of the SR in striated muscles.