Kawasaki Journal of Medical Welfare Vol.1 No.1 1995 131-136

Original Papers(None)

The Voltage Sensitive Ca^{2+}-Channel Blocker Affected the Ca^{2+}-Release from Ca^{2+}-Channel of the Sarcoplasmic Reticulum Membrane in the Skeletal Muscle

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(Accepted 1995-10-30 00:00:00+09)

Key words:skeletal muscle, Dihydropyridine, sarcoplasmic reticulum voltage dependent Ca-channel, Ca-release channel

Abstract

The effects of nicardipine as the Ca-antagonist in the dihydropyridine receptor (DHPR) of the transverse (T) tubular voltage sensor (Ca^{2+} channel) were studied in isolated frog skeletol muscle fibers. Nicardipine suppressed the twitchtension about 40% with repeated tetanic stimulation, and suppressed more than 80% with repeated applications of high potassium. When caffein contracture on the nicardipine treated muscle fibers was induced by concentrations of lower than 5 mM caffeine, an inhibitory effect was seen with repeated tetanic stimulation. On the contrary, an activation effect was seen on the nicardipine treated muscle fibers with repeated potassium deporalization. However, caffeine contracture with concentrations of more than 5mM had not the different effects on the both nicardipine treated muscles. These results show that the voltage sensor in the T-tubular membranes has influence on the Ca-release from sarcoplasmic reticulum (SR) with caffeine, and was suggested that the SR membranes has the Ca induced Ca release channels which was inhibited by the voltage sensor on the T-tubles.