Activation of calcium channels in sarcoplasmic reticulum from frog muscle by nanomolar concentrations of ryanodine

Bull,

Marengo,

Suárez-Isla,

Donoso,

Sutko,

Hidalgo,

Sarcoplasmic reticulum vesicles isolated from fast-twitch frog skeletal muscle presented two classes of binding sites for ryanodine, one of high affinity (Kd1 = 1.7 nM, Bmax1 = 3.3 pmol per mg) and a second class with lower affinity (Kd2 = 90 nM, Bmax2 = 7.0 pmol per milligram). The calcium channels present in the sarcoplasmic reticulum membranes were studied in vesicles fused into lipid bilayers. Low concentrations of ryanodine (5 to 10 nM) activated a large conductance calcium channel after a short delay (5 to 10 min). The activation, which could be elicited from conditions of high or low fractional open time, was characterized by an increase in channel fractional open time without a change in conductance. The open and closed dwell time distributions were fitted with the sum of two exponentials in the range of 4 to 800 ms. The activating effect of ryanodine was due to an increase of both open time constants and a concomitant decrease in the closed time constants. Under conditions of