Supplementary Material

Comprehensive Simulation of Ca²⁺ Transients in the Continuum of Mouse Skeletal Muscle Fiber Types

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The simulation of tetanic Ca²⁺ transients was extended during 10 s and the mechanisms that required more time to return to equilibrium are presented in Fig S1. In the sarcoplasm, PV and TNS returned to their resting states after 6 ms. About the same time was required for CSQ in the SR. The mitochondrial buffers require more than 10 ms. The transmembrane fluxes also remained activated for time intervals greater than 6 s. In fibers IIX and IIB, the fluxes maintained their rate for a longer time, presumably due to the Ca²⁺ stored in the sarcomplasmic binding sites and in the SR.
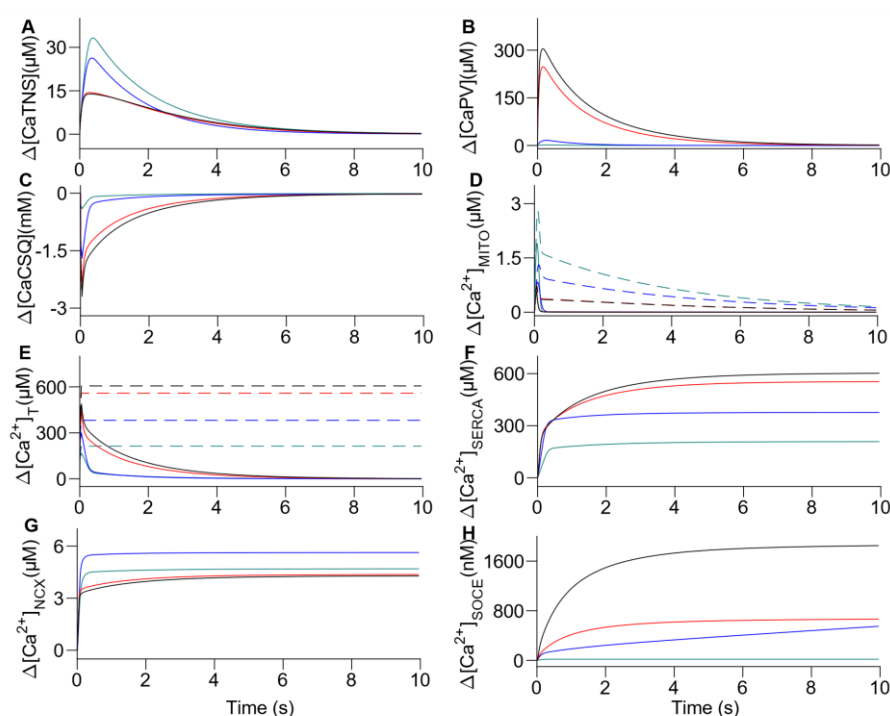
Figure S1. Simulation of tetanic Ca²⁺ transients during an extended time interval. The $\Delta[Ca^{2+}]$ coupled to the high affinity sarcoplasmic buffers: TNS (**A**) and PV (**B**); the SR buffer: CSQ (**C**); the free (solid line) and total $\Delta[Ca2+]_{MITO}$ (dashed line) (**D**) are shown. The total $[Ca^{2+}]$ in the sarcoplasm (solid line) and the total $[Ca^{2+}]$ released (dashed line) were obtained following the same procedure as in Fig. 2I (**E**). The integral of the fluxes in time across the sarcolemma, produced by the SERCA pump, the NCX and the SOCE, were also obtained (**F**, **G**, **H**).

Table S1. Rate constants used in the model for Ca^{2+} and Mg^{2+} binding reactions at 22°C.

Binding sites	k_+	k_-	Reference
Ca^{2+}-Tn	2.68×10^8 M^{-1} s^{-1}	2340.2 s^{-1}	[16] & Present work
Ca^{2+}-CaTn	1.34×10^8 M^{-1} s^{-1}	25.9 s^{-1}	[16] & Present work
Ca^{2+}-TNS	2.44 M^{-1} s^{-1}	0.488 s^{-1}	[13] & Present work
Mg^{2+}-TNS	8.12 M^{-1} s^{-1}	1.62 s^{-1}	[13] & Present work
Ca^{2+}-PV	0.632×10^8 M^{-1} s^{-1}	0.8 s^{-1}	[16] & Present work
Mg^{2+}-PV	0.5×10^5 M^{-1} s^{-1}	4.5 s^{-1}	[16] & Present work
Ca^{2+}-ATP	0.2067×10^8 M^{-1} s^{-1}	45.5 s^{-1}	[16] & Present work
Ca^{2+}-CSQ	44×10^6 M^{-1} s^{-1}	3446 s^{-1}	[27] & Present work
Ca^{2+}-B	0.6×10^6 M^{-1} s^{-1}	0.156 s^{-1}	[14] & Present work

References

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