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Intracellular Control Mechanisms of Cardiac Contraction & Energetics

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The major hypothesis underlining the present study is that the regulation of cardiac muscle contraction, and cardiac work, is based on the intracellular control of calcium kinetics and crossbridge cycling. The cardiac muscle fiber contraction and the LV function are determined by two intracellular control mechanisms: a cooperativity mechanism and a negative mechanical feedback. The hypothesis is substantiated by the successful description of the cardiac fiber mechanical performance and the analytical explanation of the regulation of biochemical to mechanical energy conversion by the sarcomere, i.e., the force-length relationship,the force-velocity relationship, the control of relaxation and the linear relationship between energy consumption and the generated mechanical energy.

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