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Low-Frequency Changes in Rigor Crossbridge State – A Reflection of Correlated Motion? CAROLINE RITZ-GOLD, Center for Biomolecular Studies — The structure of muscle fibers in the state of rigor takes the form of a hierarchic, interconnected filament network. In this network, individual rigor crossbridges are strongly bound to actin and exist in two different conformational states. We have used EPR spectroscopy of spin-labeled fiber bundles to monitor changes in these conformational states as a function of time. These changes appeared in the time-series data as spontaneous, irregular fluctuations taking place on many time scales – with a period ranging from minutes to hours. When fibers were treated with the substrate analog MgPPi, the time series exhibited a slowly-decaying large-amplitude response transient. The power spectra of both types of time-series data took a 1/f-like form with a mean slope of –1.3. This kind of 1/f-like behavior has been taken to reflect complexity and long-range correlations in many types of real-world system. We conclude that the low-frequency changes we have observed in crossbridge state may reflect the presence of long-range correlated motion taking place within the rigor-state filament network.

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