

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Range of spectral exponents in rigor-state muscle fibers – a 1/f noise family affair? CAROLINE RITZ-GOLD, Center for Biomolecular Studies, Fremont CA 94536 — Using EPR spectroscopy, we have followed changes in crossbridge state in rigor-state muscle fibers as a function of time. These observed changes were of two types – erratic fluctuations taking place on multiple time scales, and slowly-relaxing transients in response to substrate analog. For both types of change, the resulting power spectra had a 1/f-like power-law form with spectral exponents ranging from near 0 (white noise) to around 2 (brown noise). The average exponent was around 1 (pink noise). This observed broad range of spectral exponents is similar to that seen in the extended-family model of 1/f noise processes – a model that includes members ranging from white noise to pink to brown (JM Halley, Trends. Ecol. Evoln. 11, 33, 1996). Properties of this extended family model include self-affinity, long correlation times (memory), and non-stationarity (JM Halley & P Inchausti, Fluct. Noise. Lett 4, R1, 2004). We conclude that the broad range of spectral exponents observed in rigor-state muscle fibers reflects a type of underlying 1/f process. However, this particular type of process is unusual in that, although produced by a single biological source (rigor muscle fibers), it appears to include not just one but all of the members of the extended 1/f noise family – from white to pink to brown.

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Date submitted: 10 Dec 2010

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