

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Electrophoretic Mobility of Sarcoplasmic Reticulum Vesicles is determined by Amino Acids of A+P+N Domains of Ca²⁺-ATPase LAURA SATTERFIELD, ROBERT WORD, JONATHAN ABRAMSON, PAVEL SMEJTEK, Department of Physics, Portland State University, Portland, Oregon 97207 — It was found that the electrophoretic mobility of sarcoplasmic reticulum (SR) vesicles originates from ionizable amino acids of cytoplasmic domains of the Ca²⁺-ATPase, the Ca²⁺ pump of SR. The mobility was measured at pH 4.0, 4.7, 5.0, 6.0, 7.5, and 9.0 in the region of ionic strength from 0.05 to 0.2 M. Mobility data were supplemented by studies of SR vesicles by photoelectron microscopy. The mobility data were analyzed using Helmholtz-Smoluchowski model. The charge of the SR vesicles is dominated by the charge of the Ca²⁺-ATPase. The charge is due to ionized amino acids obtained from the amino acid sequence of Ca²⁺ pump, pKa and pH. It was shown that a linear relationship exists between the mobility and the total charge on three cytoplasmic domains of Ca²⁺ pump: A, P, and N. The relationship between mobility, μ , and the charge of A, P, N domains of the Ca²⁺ pump, Q, is $\mu = \alpha + \beta*Q$ where $\beta = 0.033 \pm 0.002$ mu/e and $\alpha = 0.11 \pm 0.02$ mu. The mobility unit, mu = 1×10^{-8} m²-V⁻¹-s⁻¹.

Pavel Smejtek
Portland State University

Date submitted: 19 Nov 2009

Electronic form version 1.4