Electrical Double Layers in Biology

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PREFACE

A number of apparently unrelated phenomena in biological systems (e.g., biopolymer aggregation, cell-cell interactions, ion transport across membranes) arise from the special properties of charged surfaces. A symposium entitled "Electrical Double Layers in Biology", which took place at the Toronto meeting of the Electrochemical Society, 12-17 May 1985, focused on the common features of these phenomena. The papers presented at that symposium are collected here and they illustrate ways in which an understanding of electrical double layers can elucidate a problem in Biology. An example of this approach can be seen from the paper I presented on ion transport and excitation, where the "unusual" ion flows during nerve excitation are actually expected if one includes the effects of electrical double layers at membrane surfaces. Furthermore, the selectivity of the ion channels in these membranes can be better understood on this basis. Other presentations account for such observations as the changes in spacing between muscle proteins during contraction, the interactions of red cells to form rouleaux, the electrical properties of algal cell membranes, electrokinetic potentials during blood flow in arteries, etc.

I trust that these papers will indicate the value of electrochemistry in the study of biological systems, an area of research usually called Bioelectrochemistry, and will encourage biologists to use these ideas when approaching related problems.

Martin Blank
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CONTENTS

Donnan Potential and Surface Potential of a Charged Membrane and Effect of Ion Binding on the Potential Profile	1
S. Ohki and H. Ohshima	
An Empirical Relation for the Surface Potential of Phosphatidic Acid Monolayers: Its Dependence on Calcium and the Role of Double Layer Theory	17
J. A. DeSimone, G. L. Heck, and S. K. DeSimone	
A Fundamental Question about Electrical Potential Profile in Interfacial Region of Biological Membrane Systems	31
V. S. Vaidhyanathan	
The Effect of Water Polarization and Hydration on the Properties of Charged Lipid Membranes	53
I. S. Graham, A. Georgallas and M. J. Zuckermann	
Influence of the Surface Charge Distribution and Water Layers on the Permeability Properties of Lipid Bilayers	63
E. A. Disalvo and L. S. Bakás	
Facilitation of Ion Permeability of Bilayer Membranes and their Phase Transition	77
I. R. Miller	
Single Channel Conductance Changes of Desethanolamine- Gramicidin through pH Variations	91
R. Reinhardt, K. Janko, and E. Bamberg	
Membrane Potential of Squid Axons	103
S. Ohki	
Electrical Double Layers in Ion Transport and Excitation	119
M. Blank	
Electrical Double Layers in Pigment-Containing Biomembranes	129
F. T. Hong and T. L. Okajima	
Electronic Properties of Electroactive Bilayer Lipid Membranes	149
H. Ti Tien, J. Kutnik, P. Kryszinski, and Z. K. Lowjewska	
Electron Transfer at Biological Interfaces	167
A. Rejou-Michel, M. A. Habib, and J. O'M. Bockris	

Alterations in Electrical Double Layer Structure Due to Electromagnetic Coupling to Membrane Bound Enzymes	185
J. D. Bond and N. C. Wyeth	
Transient Impedance Measurements on Biological Membranes: Application to Red Blood Cells and Melanoma Cells	201
R. Schmukler, J. J. Kaufman, P. C. Maccaro, J.T. Ryaby, and A. A. Pilla	
Measurement of the Frequency-Dependent Impedance across Natural Cell Membranes	211
S. M. Ross	
Electrorotation of Single Cells - A New Method for Assessment of Membrane Properties	227
R. Glaser and G. Fuhr	
Recent Studies on Electrokinetic Potentials in Humans	243
E. Findl, H. Guthermann, and R. J. Kurtz	
Effects of pH Before and After Deep-Freeze Storage at -80° C on the Zeta Potentials of Bones	257
W. K. Elwood, S. D. Smith, and H. E. McKean	
Electrochemical and Macromolecular Interactions at Red Blood Cell Surface	267
K.-M. Jan and S. Simchon	
The Myosin Filament, Charge Amplification and Charge Condensation	277
G. F. Elliot, E. M. Bartels, and R. A. Hughes	
Donnan Potentials Generated by the Surface Charge on Muscle Filaments	287
E. W. April and R. A. Aldorty	
Long-Range Electrostatic Forces in Cylindrical Systems: Muscle and Virus Gels	301
B. M. Millman	
Contributors	313
Index	317