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Richard Naftalin, Guest Editor

Foreword

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Introduction

I am very grateful to Prof. Werner Loewenstein and the editorial board of the Journal of Membrane Biology for giving me this opportunity to assemble these papers around the theme of epithelial solute and water transport. Since its foundation in 1969 the Journal of Membrane Biology has provided a magnificent forum for membrane biologists. Long may it continue.

I have been extremely fortunate to have worked alongside almost all the principal contributors — not Lucas, yet — to this issue of the Journal of Membrane Biology.

Ana Ilundain and I worked in London on regulation of small intestinal fluid secretion, and a lucky break – a hint from the late Ora Rosen, led us to the discovery of the controlling role of calmodulin, or as it was then called, Ca^{2+}-dependent regulator protein, in Cl^- movement across the apical border of small intestine. Ana, unlike me, has stayed loyal to the small intestine and has been rewarded for this by the success of team-Ilundain in characterizing new Na^+-dependent transport mechanisms for creatine, carnitine and mannose.

Andrew McKie came from Michael Lucas's laboratory in Glasgow to work on his Ph.D. with me. He arrived at a critical period when we were grappling with the absorptive and dehydrating potential of the colon. His work along with that of David Bleakman, Peter Zammit and Marivi Mendizabal-McKie and Kevin Pedley showed that crypt absorption was hypertonic and capable of generating a large fluid tension within feces in contact with the descending colonic mucosal wall. Andy has since become one of the leaders in the field of iron transport. His work has elucidated the major iron transport pathways across the intestinal wall.

Subrata Tripathi pioneered work in London on intestinal volume changes using an optical lever with infinite patience and yogic *pranayama*. No great surprise that the technique has not been adopted by the heavily breathing multitudes. His London experience was a firm grounding for his subsequent work on isolated renal tubular perfusions, black lipid membranes, and now examination of regional function in *Drosophila* gut. This latter work may prove useful in analyzing how genetic mutations affect gut development—although its application may cause a bit of a logjam in laboratories using high-throughput screening.

Michael Lucas has remained steadfastly with in vivo intestinal physiology as lesser spirits have handed in their animal licenses and taken up cell cultivation. He shares with many of the pioneers in epithelial physiology exceptional analytical power. This gives him the confidence to oppose conventional views on "secretion" steadfastly. His paper here shows that most views about fluid secretion are off beam.

Stuart Milligan, the only non-intestinal physiologist on the list, is a Reproductive Physiologist. Our collaboration arose from a conversation we had about the similarity between endometrial glands and colonic crypts—both structures that seemed to go nowhere. Stuart's knowledge of the lack of understanding of the mechanical factors leading to blastocyst implantation and our joint curiosity about this led eventually to the novel uterine perfusion techniques that Naguib Salleh has developed, whilst standing on the shoulders of Jay Thiagarajah. Although the phenomena of uterine fluid absorption are much less obscure, more work is needed to elucidate how progesterone exercises control over uterine fluid absorption.

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Miquel Moreto, with his wife Joana Planas, spent time working with me on laxative-induced K secretion in colonic mucosa contemporaneously with Subrata Tripathi's and Ana Ilundain's time in London. On returning to Spain he developed an interest in animal nutrition and has made many important studies on environmental and dietary factors that modulate growth of domestic animals. This difficult and painstaking work can only be undertaken with superb organization and plenty of stamina. Spain and Barcelona University in particular have wisely made a large investment in biological research. So Miquel and his team, in which I am a proud member, have been able to work with facilities available to few. Here they show that there is more to aldosterone action than just up-regulation of ENaC.

I sense that many of the old dogmas, particularly those relating to membrane carrier transport and epithelial water flows, which have dominated membrane physiology for the last half century, are beginning to spring some serious leaks; maybe this volume will quicken the flow.