Corrections

The following abstract was mistakenly omitted from the February 1998 Abstract Issue of the Biophysical Journal, Volume 74, Number 2, Part 2:

Th-Pos337

CARBON DIOXIDE AND BICARBONATE PERMEABILITY OF COLON EPITHELIUM FROM 18-O EXCHANGE IN INTACT ISOLATED GUINEA PIG COLON ((G. Gros, M.A. Wunder, P. Boellert.)) Zentrum Physiologie, Medizinische Hochschule Hannover, 30623 Hannover, Germany

We have studied the exchange of 18-O between bicarbonate, carbon dioxide and water in the presence of intact isolated guinea pig colon using mass spectrometry. The course of this exchange process is determined by the intracellular carbonic anhydrase activity and by the membrane permeabilities for carbon dioxide and bicarbonate of the colon epithelium. The colon was either everted, allowing us to study the exchanges across the apical membrane, or non-everted, allowing us to observe the process across the serosal membrane. Using a new mathematical approach, the results were evaluated to give apical (or serosal) permeabilities for carbon dioxide and bicarbonate. In the apical membrane of the proximal colon, we find a bicarbonate permeability of 1.7×10^{-4} cm/s and a carbon dioxide permeability of 5×10^{-3} cm/s. The latter value is almost three orders of magnitude lower than the value of 2 cm/s reported for the red cell membrane (Gros and Bartag, 1978). This very low carbon dioxide permeability of the apical membrane can be explained either i) as an intrinsic property of this membrane, or ii) by assuming an about 35 micrometers thick unstirred water layer covering the apical surface. DIDS had no effect on 18-O exchange and thus, unlike in red cells, affected neither carbon dioxide nor bicarbonate permeability. We conclude that, similar to what has been reported for some other epithelial cell membranes, the apical membrane of proximal colon exhibits a low permeability for carbon dioxide. A possible interpretation of this result is the presence of a significant unstirred layer on the apical surface.