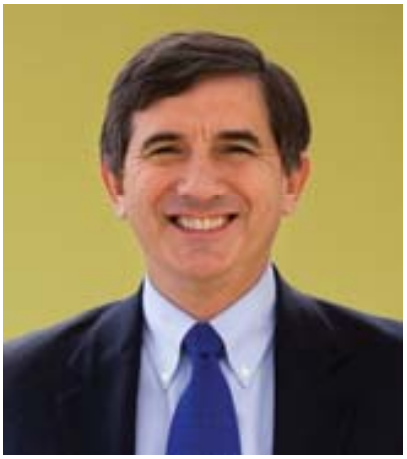
Seminars in Zoophysiology at Aarhus University



Gas Channels

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The traditional dogma holds that gases diffuse through biological membranes by dissolving in the lipid phase of the membrane. While this mechanism may explain how many gases move through many membranes, it is now clear that both aquaporins (AQPs) and the Rhesus (Rh) proteins can serve as pathways for diffusion of both CO_2 and NH_3 and that the fluxes of these through channels play physiologically important roles in red blood cells (RBCs) and certain renal tubule cells. Using surface-pH transients as a sensitive detection of CO_2 and NH_3 movements across membranes of *Xenopus* oocytes, we have found that AQP and Rh protein have characteristic CO_2/NH_3 permeability ratios, providing evidence for gas selectivity by these channels. Our studies indicate that the gas selectivity's can be ascribed to different pathways of CO_2 and NH_3 through these membrane proteins. Our most recent preliminary data suggest that channels may also represent the major pathway for O_2 movement across the membrane of erythrocytes. However, it seems that the contributions of AQP1 and the Rh complex are relatively minor compared to those of 2 as-yet-unidentified channels. We hypothesize that respiratory gases—and other gases such as NH_3, CO, and NO—may diffuse through gas channels rather than the lipid membrane in many cells.

Wednesday Aug 31st at 11.15 at Zoophysiology