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Transport of taurine across the blood brain barrier: Physiopathological implications

Hector Rasgado-Flores*, Ashwini Mokashi, and Richard A. Hawkins
Rosalind Franklin University of Medicine and Science, USA

Abstract

Luminal and abluminal plasma membranes, isolated from bovine brain microvessels, were used to characterize Na^+-dependent and facilitative taurine transport. Initial transmembrane potential was -59 mV, external Na^+ was 126 mM, and T= 25˚C. Apparent affinity constants of the taurine transporters were determined over a range of taurine concentrations from 0.24 µM to 11.4 µM. Abluminal membranes had Na^+-dependent taurine transport as well as facilitative transport; luminal membranes only had facilitative transport. Apparent K_m's for facilitative and Na^+-dependent taurine transports were 0.06 ± 0.02 µM and 0.7 ± 0.1 µM, respectively. Na^+-dependent transport of taurine was voltage dependent between -25 to -101 mV. Transport was over 5 times greater at –101 mV compared with V_m was –25 mV. Sensitivity to external osmolality of Na^+-dependent transport was studied over a range of osmolalities (229 to 398 mOsm/kg H_2O) using mannitol as the osmotic agent to adjust osmolality. For these experiments the concentration of Na^+ was maintained constant at 50 mM; the calculated transmembrane potential was -59 mV. Na^+-dependent transport was sensitive to osmolality with the greatest rate observed at 229 mOsm/kg H_2O.

Biography

Hector Rasgado earned his PhD from the Department of Physiology at the University of Maryland in 1984. He also received his postdoctoral training in that department as well as in the Department of Physiology at the Chicago Medical School. In 1988, Rasgado received his first NIH grant and joined the Department as a faculty member. He remains at the Department of Physiology & Biophysics at the university, now renamed as the Rosalind Franklin University of Medicine & Science.
Rasgado's research focuses on the regulation of intracellular Mg2+ and Ca2+ ions and cell volume regulation in muscle cells. His main contributions to these fields have been characterizing a novel plasmalemmal transporter for Mg2+, helping to understand the mechanisms by which muscle cells sense and control their volume in response to their needs and/or to changes in their environment, and contributing to our understanding of how and why muscle cells undergo cell volume changes during their contraction. Rasgado has been an active member of APS, including serving on the International Physiology Committee. His leadership abilities on the Committee led to his being named Chair for two consecutive terms. He initiated a program to support specialized meetings for physiologists in Mexico and Latin and South America that are held in their own countries and have speakers from the US that are paid for in part by APS.

hector. rasgado@rosalindfranklin.edu