PHENOTYPIC CHARACTERIZATION OF THE HUMAN BLOOD-NERVE BARRIER EX VIVO
NEJLA YOSEF, M.S., ROBIN H. XIA, M.D., Ph.D., EROBOGHENE E. UBÓGU, M.D.
NEUROMUSCULAR IMMUNOPATHOLOGY RESEARCH LABORATORY, DEPARTMENT OF NEUROLOGY, BAYLOR COLLEGE OF MEDICINE, HOUSTON, TEXAS, UNITED STATES OF AMERICA.

Introduction: The phenotypic characteristics of the human blood-nerve barrier (BNB) provide functional insights important to endoneurial homeostasis and disease states.

Objectives: Determine the expression of transporters, cell adhesion molecules and tight junction proteins on primary human endoneurial endothelial cells (pHEndECs) that form the BNB.

Methods: pHEndECs isolated from decedent sciatic nerves were plated at 10,000-15,000 cells/cm² on collagen-coated Petri dishes, glass coverslips or transwell inserts. Proliferation assays were performed and confluent layers characterized using enzyme- and immuno-cytochemistry, flow cytometry and polymerase chain reaction at passages 3-10.

Results: pHEndECs double in number every 48 hours during the logarithmic phase of growth. pHEndECs express enzymes alkaline phosphatase and γ-glutamyl transpeptidase; transporters glucose transporter-1, p-glycoprotein, large neutral amino acid transporter-1, monocarboxylic acid transporter-1 and creatine transporter. There is basal expression of CD34, and cellular adhesion molecules intercellular adhesion molecule-1, vascular cell adhesion molecule-1 and fibronectin connecting segment-1. Tight junction proteins zona occludens-1, occludin, claudins-1,-2 and -5, and junctional adhesion molecule-A are also expressed, indicative of the restrictive BNB.

Conclusions: pHEndECs retain essential phenotypic characteristics during serial passaging and provide a cell line to study physiological and pathologic processes at the BNB ex vivo.

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