Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Influence of curvature on the morphology of brain microvascular endothelial cells MAO YE, ZHEN YANG, ANDREW WONG, PETER SEARSON, Johns Hopkins University, SEARSON GROUP TEAM — There are hundreds or thousands of endothelial cells around the perimeter of a single artery or vein, and hence an individual cell experiences little curvature. In contrast, a single endothelial cell may wrap around itself to form the lumen of a brain capillary. Curvature plays a key role in many biological, chemical and physical processes, however, its role in dictating the morphology and polarization of brain capillary endothelial cells has not been investigated. We hypothesize that curvature and shear flow play a key role in determining the structure and function of the blood-brain barrier (BBB). We have developed the "rod" assay to study the influence of curvature on the morphology of confluent monolayers of endothelial cells. In this assay cells are plated onto glass rods pulled down to the desired diameter in the range from 5 – 500 μm and coated with collagen. We show that curvature has a significant influence on the morphology of endothelial cells and may have an important role in blood-brain barrier function.

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Date submitted: 26 Nov 2012 Electronic form version 1.4