Cerebrospinal Fluid Research

Oral Presentation

Altered expression of sialic acid-bearing glycoconjugates as revealed by lectin binding to choroid plexus in perinatal hydrocephalic rats

P McMillan*, S Flaherty, A Spangenberger, H Jones, J Duncan and C Johanson

Address: Brown Medical School/RI Hospital, Providence, Rhode Island, USA

Email: P McMillan* - Paul_McMillan@Brown.edu

* Corresponding author

from 48th Annual Meeting of the Society for Research into Hydrocephalus and Spina Bifida
Dublin, Ireland, 23–26 June 2004
Published: 23 December 2004

Cerebrospinal Fluid Research 2004, **1**(Suppl 1):S31 doi:10.1186/1743-8454-1-S1-S31

This article is available from: http://www.cerebrospinalfluidresearch.com/content/1/S1/S31

Glycoconjugates perform key roles in the development and maintenance of the CNS. A chief saccharide element in brain development is sialic acid, usually occurring as N-acetyl-neuraminic acid. Previous studies by H. Jones et al. demonstrated that glyco-conjugate secretions into CSF, by circumventricular organs like the SCO, may be associated with hydrocephalus development. Therefore, we used 4 lectins (LPA, SNA, MAL-II and WGA), specific for several forms of sialic acid, to probe for alterations in sialic acid-bearing glycoconjugate profiles in the CSF-secreting choroid plexus (CP) of the HTx rat hydrocephalus model. Lectins are proteins that bind to carbohydrate residues in an antibody-like manner. We used 3 cohorts of rats: prenatal (20 days of gestation); neonatal (1 day after birth); and postnatal (4 days). Five choroid epithelial domains/parameters were analyzed: apical cell surface; lateral surface; basal surface; cytoplasm; and all domains considered collectively. Staining intensity was judged visually on a 1+ to 4+ scale, at 400×. Means of sialic acid staining intensity were calculated using 5 animals from each cohort.

Results

Staining of controls decreased about 25% per stage, whereas it remained high (4+) in hydrocephalic animals at all stages. At all perinatal stages, sialic acid expression was higher in hydrocephalic animals than in controls. Staining of all cellular domains, normally and in hydrocephalus, was strongest in neonates. With regard to individual domains, the most intense staining of normal and hydrocephalic animals was seen in the apical domain of CP cells. The greatest differential in staining between normal and hydrocephalic rats was in the cytoplasmic domain. We postulate that the enhanced expression of sialic acid-bearing glycoconjugates in CP is related to changes in hydrocephalic CSF parameters.

Funding

Supported by Lifespan (Rhode Island Hospital), the Department of Neurosurgery, and by NIH NS RO1 27601 (CEJ).