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Abnormalities in perineuronal nets and behavior in mice without CSGalNAcT1, a key enzyme in chondroitin sulfate synthesis in brain

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Chondroitin sulfate (CS) is an important glycosaminoglycan and is mainly found in the extracellular matrix as CS proteoglycans. In the brain, CS proteoglycans are highly concentrated in perineuronal nets (PNNs), surrounding synapses and modulate their functions. To investigate the importance of CS, we produced mice that were deficient in a CS synthesizing enzyme, CSGalNAcT1 (T1KO). Biochemical analysis of T1KO revealed that loss of this enzyme reduced the CS amount by a half in various brain regions. The accumulationt of CS in PNNs was also diminished in T1KO compared to wild-type mice, although the amount of a major CS proteoglycan core protein, aggrecan, was not changed. In T1KO, we observed abnormalities in several behavioral tests, including the open-field test, acoustic startle response, and social preference. These results suggest that T1 is important for higher brain functions, probably due to regulation of CS-dependent PNNs, and that T1KO is a good model for investigation of PNNs.

Biography

Michihiro Igarashi was graduated from University of Tokyo and a MD degree in 1983, and also has completed his PhD course from University of Tokyo, Graduate School of Medical Sciences in 1987. He has experienced a research fellow in Medicine in Massachusetts General Hospital-East from 1991-1993. He is a Professor and the Chair of Department of Neurochemistry and Molecular Cell Biology in Niigata University Graduate School of Medical and Dental Sciences since 2000. He has published more than 50 papers in reputed journals and has been serving as an editorial board member of Journal of Biochemistry (Tokyo) and Neuroscience Research.

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