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Go	
Year:	Vol: Page:

First published online December 20, 2007

Submitted on June 8, 2007

Accepted on November 12, 2007

CANCER STEM CELLS

The Stem Cell Marker Prominin-1/CD133 On Membrane Particles In Human Cerebrospinal Fluid Offers Novel Approaches For Studying CNS Disease

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Abstract

Cerebrospinal fluid (CSF) is routinely used for diagnosing and monitoring neurological diseases. The CSF proteins used so far for diagnostic purposes (except for those associated with whole cells) are soluble. Here we show that human CSF contains specific membrane particles that carry prominin-1/CD133, a neural stem cell marker implicated in brain tumors, notably glioblastoma. Differential and equilibrium centrifugation and detergent solubility analyses showed that these membrane particles were similar in physical properties and microdomain organization to small membrane vesicles previously shown to be released from neural stem cells in the mouse embryo. The levels of membrane particle-associated prominin-1/CD133 declined during childhood and remained constant thereafter, with a remarkably narrow range in healthy adults. Glioblastoma patients showed elevated levels of membrane particle-associated prominin-1/CD133, which decreased dramatically in the final stage of the disease. Hence, analysis of CSF for membrane particles carrying the somatic stem cell marker prominin-1/CD133 offers a novel approach for studying human central nervous system disease.

Key Words. Glioma, Human hematopoietic stem cells, Malignancy, Nervous system, Somatic stem cells

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