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### Investigation of annexin A5 as a biomarker for Alzheimer's disease and Dementia with Lewy bodies

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**Background:** Alzheimer's disease (AD) differs from other forms of dementia in its relation to amyloid beta peptide (A $\beta$ 42). Using a cell culture model we previously identified annexin A5, a Ca<sup>2+</sup> and phospholipid binding protein, as an AD biomarker. Plasma level of annexin A5 was significantly higher in AD patients compared to that in a control group. As AD shares clinical and pathological features with Dementia with Lewy bodies (DLB), the present study was done to examine the similarity of AD and DLB using the plasma AD biomarker annexin A5.

**Methods:** The manner in which this study was conducted met with the approval of Sapporo Medical University Ethics Committee. Blood samples were obtained from 150 patients with AD (aged 77.6  $\pm$  6.5 years), 50 patients of DLB (79.4  $\pm$  5.0) and 279 community-dwelling healthy elderly individuals of comparable age and sex (75.6  $\pm$  8.1). All AD patients met NINCDS-ADRDA criteria and all DLB patients were diagnosed as probable DLB according to the latest consensus diagnostic criteria. Blood was drawn with Venoject II vacuum tubes containing EDTA and the plasma fraction was isolated by centrifugation. Annexin A5 present in the specimen was trapped by a monoclonal antibody (mAb) against annexin A5 (clone No. 23) conjugated to a glass bead, and an HRP-labeled mAb against annexin A5 (No. 49). Quantification was done using the Chemiluminescent Enzyme Immunoassay Technique (SphereLight assay). This system was useful to quantify plasma annexin A5 from the range of 0.16-20ng/ml.

**Results:** The plasma level of annexin A5 was significantly higher in AD patients than in the healthy individuals (control) ( $P < 0.0001$ ). The plasma annexin A5 level was also significantly higher in DLB patients than in the control group ( $P < 0.0001$ ). From the ROC curve with plasma annexin A5 concentrations, the mean areas under the curve were 0.898 and 0.838 for the AD/control and DLB/control, respectively. This suggests that annexin A5 is a common marker for both AD and DLB, which implies the probability of a pathological aspect of overlapping of AD and DLB.

**Conclusions:** Annexin A5 is a novel plasma biomarker candidate for both AD and DLB.

#### Biography

Hitoshi Sohma completed his Ph.D. in biochemistry at Hokkaido University, Japan, focusing on Ca<sup>2+</sup>-signaling in cell-cell communications, and his postdoctoral studies at the National Institute of Mental Health, NIH. He is a professor in the Department of Educational Development, Sapporo Medical University Center for Medical Education, Sapporo, Japan. He is also involved in both pathobiochemical research and the management of medical education at the university.

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