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## **Nanowired delivery of cerebrolysin reduces Alzheimer's disease pathology following amyloid beta infusion aggravated by concussive head injury**

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Concussive head injury (CHI) is quite frequent in military personnel during combat operation. CHI induced breakdown of the blood-brain barrier (BBB) causing brains to be more vulnerable to peripheral toxins and other adverse reactions. Thus, this is likely that CHI may induce brain damage leading to enhanced reaction with additional amyloid beta peptide (A $\beta$ P) exposure causing adverse Alzheimer's disease (AD) pathology. This hypothesis was tested in this investigation. AD like pathology was induced by A $\beta$ P infusion (50 ng/10  $\mu$ l, i.c.v. daily for 4 weeks) in control and CHI rats. CHI was inflicted by an impact injury (0.224 N) on the right skull without fracture to simulate clinical conditions. We found that ABP infusion in CHI cases results in 8 to 12 fold higher deposition of ABP in various brain areas and accumulation of tau proteins. A significantly higher increase in CSF tau proteins was also seen in CHI group than normal rats induced with identical A $\beta$ P. In these groups of animals BBB and blood-CSF barrier (BCSFB) was also broken down for Evans Blue albumin. Brain edema, neuronal injuries, activation of astrocytes closely corresponds to the tau protein concentrations in the brain. Interestingly TiO<sub>2</sub> nano-wired delivery of cerebrolysin, a balanced composition of neurotrophic factors and peptide fragment (2.5 ml/kg, i.v. daily for 3 weeks after 1 week of A $\beta$ P infusion), resulted in marked neuro-protection in CHI induced exacerbation of AD pathology. This indicates that CHI aggravates AD pathology and nano-wired cerebrolysin has a therapeutic value, not reported earlier.

### **Biography**

Aruna Sharma, MD is currently Secretary of Research International Experimental Central Nervous System (CNS) Injury & Repair (IECNSIR) at Uppsala University Hospital, Uppsala University, Sweden. She obtained her Bachelor of Science in 1971 and Medicine degree in 1977. Dr Sharma engaged in medical research from 1978 to 1986 in India on University Grants Commission and Indian Council of Medical Research Programs. She is expert Neuropathologist (Free University Berlin, Germany 1989-1991; Neuropathology Institute Uppsala 1992-1995) and the Lead Investigator in Several International Research Projects in association with US Govt, Indian Govt, and EU Program on Nanomedicine with regards to CNS Function, toxicology, neurorepair and neuroprotection including Ayurvedic traditional drugs containing metal oxide and/or ashes. Dr Sharma is member of several Distinguished American Organizations and elected to receive the prestigious award "Women of the Years Representing Sweden Award 2009" for her outstanding contributions towards society by American Biographical Research Institute, USA; and "Best Professional Business Women Award 2010" For Setting Standard to Motivate, Excel and Inspire Others, Raleigh, North Carolina, USA. She has published over 60 original research papers in Reputed Neuroscience Journals and is currently Acquisition Editor of American Journal of Neuroprotection and Neuroregeneration.

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