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### BBB a gateway for neurodegeneration-neuroprotection

Recent advancements in bionanotechnology lead to the development of several nanoformulation to deliver drugs to the central nervous system (CNS) for enhancing the therapeutic potential of the parent compounds. Nanodrug delivery could allow the active compounds to enter faster in the CNS in high quantity and may remain there for prolonged periods of time due to slower degradation resulting in enhanced therapeutic effects. For this purpose, several techniques for nanodrug delivery are used e.g., incorporation of drugs into soft nanoparticles, carbon nanotube as well as tagging them to nanowires made from different nanomaterials viz., SiO<sub>2</sub>, Cu, Ag, or Al. However, the neurotoxic effects of nanomaterials *per se* on the CNS structure or function are still not well investigated. Thus, the need of the hour is to evaluate possible effects of nanomaterials on the neurotoxicity of the CNS before they are used for neurorepair. In this regard microscopy is the only technique that can precisely focus on the structural alterations of the CNS components following nanodrug delivery for neurorepair purposes. Since last decade, our laboratory is engaged in exploring the role of nanoparticles and/or nanowired drug delivery on structural changes on the CNS in animal models using both light and electron microscopy *in vivo* situations. In this review, salient features of nanoneurotoxicity and nanoneuroprotection as revealed by microscopical techniques are discussed.

### Biography

Hari Shanker Sharma is the Director of International Experimental Central Nervous system (CNS) Injury & Repair (IECNSIR) at University Hospital, Uppsala University, Sweden. He is a qualified neuroanatomist and experimental neuropathologist trained in Germany, Switzerland, Hungary, Sweden and USA. His main research interest is currently focused on neurotoxicity of nanoparticle and nanowired drug delivery of agents for enhanced neuroprotection in a variety of CNS insults or neurodegenerative diseases in relation to the blood-brain barrier (BBB) function. He has authored more than 250 original research papers and edited several book volumes or Progress in Brain Research series.

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