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Assessment of ZnO and SiO₂ nanoparticle permeability through blood–brain barrier and their toxicity using Evans blue and TEM

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Various nanoparticles (NPs) are being used in many products from paints, chemical processing, cosmetics and foods. Many of the toxicity studies with NPs suggested that their sizes alone cannot adequately explain the variety of generated toxic profiles. Recent studies with NPs have suggested that various sizes of NPs could determine *in vitro* toxicity, regardless of their chemical properties. In an attempt to address concerns regarding neurotoxicity of zinc oxide (ZnO) and silica oxide (SiO₂) NPs, they were examined after exposing them via oral, dermal, and intravenous administrations of NPs and their toxicological effects on the brain over a prescribed period of time were assessed. Physicochemical profiles were determined on particle sizes at the beginning of the current toxicity investigations on ZnO and SiO₂ NPs. After 28 days of repeated oral administrations of ZnO or SiO₂ independently, damages to the blood–brain barrier (BBB), possibly due to neurotoxicity, were investigated by Evans blue technique. Next, in order to assess whether ZnO NPs could compromise the BBB, ZnO NPs were intravenously injected five times for 35 days, with 7 days terms in total of 90 days of termination. Deposition of SiO₂ in brain from repeated dermal and oral administrations for 90 days were probed by transmission electron microscopy coupled with scanning energy-dispersive X-ray spectroscopy.

Biography

Seong Soo A An has completed his PhD from Carnegie Mellon University and Postdoctoral studies from Cornell University. He is the Associate Professor at Gachon University in the Department of Bionanotechnology and adjunct member at Gachon Medical Research Institute at Gachon University School of Medicine. He has published more than 100 papers in reputed journals and serving as an editorial board member of journals of following, *Toxicology and Environmental Health Sciences*, *Molecular & Cellular Toxicology*, and *Rapid Communication in Photoscience*.

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