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Exposure of CuO nanoparticles-its nanoneurotoxicity and potential link to neurodegeneration

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Growing evidence has indicated that exposure of nanoparticles such as MnO₂, CuO, TiO₂, etc., due to increasing use of these engineered nanomaterials (ENMs), induces nanoneurotoxicity that may pose risks for having neurodegenerative diseases such as Alzheimer's disease (AD), Parkinson's disease (PD), etc. However, the mechanisms of *in vivo* exposure and its potential contribution to neurodegeneration are not well known. Hence, our long-range objective is to study exposure of ENMs such as CuO nanoparticles and their nanoneurotoxicity and potential correlation to human diseases such as AD as Cu is abnormally enriched in Aβ amyloid deposits of AD patients' brain. In addition, previous observations and our data also suggest that: (i) long-term exposure to severe air pollution (highly possible exposure of metal oxide nanoparticles) was associated with neuroinflammation, BBB disruption, and Aβ amyloid accumulation (the salient neuropathological features of AD); (ii) Intranasal instillation of CuO nanoparticle increased BBB permeability via; (iii) exposure of CuO nanoparticles induced *in vitro* neurotoxicity, inflammation, and oxidative stress. In this invited talk, the speaker will share and discuss his lab's recent work on exposure of CuO nanoparticles and resulting nanoneurotoxicity, and its potential link to neurodegenerative diseases such as AD.

Biography

Xudong Huang has completed his Ph.D. from MIT and postdoctoral studies at Massachusetts General Hospital and Harvard Medical School. He is the Co-Director of Neurochemistry Lab, Psychiatry Department of Massachusetts General Hospital. His current research thrust is centered upon (i) validating potential link of environmental stressors such as exposure of metals and engineered nanomaterials (ENMs) and neurodegeneration; (ii) Alzheimer's genomics and image data analysis using clinical data and machine- and deep-learning based big data analytics; (iii) Discovery of novel theranostics using Artificial Intelligence (AI)-based tools. He has published more than 100 papers in reputed journals and 6 patents. He is the Editor-in-Chief for International Journal of Biomedical Nanoscience and Nanotechnology, and he serves on scientific advisory and editorial boards for many research foundations and scientific journals.

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