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Metal (Zn, Eu) Oxide Nanoparticle Show Dual Angiogenic and Neurotrophic Activity

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Ischemic diseases (cerebrovascular) are today's most dreadful diseases throughout the world leading to huge economic burden on healthcare system. Various cytokines (VEGF: vascular endothelial growth factor, bFGF: basic fibroblast growth factor, HGF: hepatocyte growth factor, NGF: nerve growth factor) have been used for the treatment of ischemic diseases using angiogenic therapy. Recent studies also reveal that application of VEGF leads to axonal outgrowth and protects neuron from ischemic injury suggesting its neurotrophic/neuritogenic as well as neuroprotective activities. However, the use of these cytokines for angiogenic therapy is associated with several disadvantages including poor bioavailability, thrombosis, non-specificity to ischemic sites, high cost etc. Hence identification of new angiogenic and neurotrophic molecule is urgently required for the treatment of ischemic diseases.

In this context, our group at CSIR-IICT is currently pursuing various nanomedicine research projects aimed at developing advanced nanomaterials for treatment of cardiovascular and ischemic diseases. Recently, we have designed and developed europium hydroxide nanorods (EHNs) andzinc oxide nanoflowers (ZONF)that exhibit excellent pro-angiogenic (Angiogenesis: formation of new blood vessels from pre-existing vasculature) and neurotrophic activities (responsible for the growth and survival of developing neurons and the maintenance of mature neurons), based on several *in vitro assays* and *in vivo*data in rat model. Considering the role of angiogenesis and neurotrophic activity in our healthcare system, EHN and ZONF nanomaterials could be potentially useful for the development of alternative effective therapeutic treatment strategies for cerebrovascular and other ischemic diseases in near future.