NANOFORMULATION FACILITATED DISRUPTION OF VASCULOGENESIS - APPROACH TOWARDS NEO-ANGIOGENIC TREATMENT

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Abstract
Cancer, to perpetuate uncontrollably requires the continuous supply of essential nutrients and oxygen at high levels, which subsequently stimulates several angiogenic factors culminating into a complication known as angiogenesis. Thus formed blood vessels feed the cancerous mass and also help in process of metastasis of cancer to distant regions. Pharmacological inhibition of angiogenesis by targeting the endothelium has proven to be an effective treatment strategy with regards to cancer and similar up-regulated disorders. The tumor vasculature formed by angiogenesis is structurally and functionally altered from the normal vasculature which generates possible options for targeting them specifically, sparing the normal vasculature in the process. Nanoformulation mediated disruption of vascular vessel is documented in this work.

SCHEME OF RESEARCH:
- Highly porous biocompatible anti-angiogenic drug loaded silica nanoparticles were synthesized and targeted towards angiogenesis for theragnostic applications.
- Tested the nanoformulation for their efficacy in imaging and therapeutics in vitro (using human endothelial - HUVEC and breast cancer MCF-7 cell lines).
- Analyzed the metabolic toxicity (cell cycle protein expression study) of drug loaded silica nanoparticles.
- Pharmacological inhibition of Angiogenesis in vivo (medaka embryos) using the anti-angiogenic nanoformulation.

RESULTS:
The nanoformulation shows effective anti-proliferative, anti-vasculogenic and anti-migratory effects on in vitro endothelial cell cultures. They caused vascular vessel disruption in medaka embryos depicting their success against treatment of angiogenesis.

Keywords: Mesoporous silica, Angiogenesis, Cancer

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