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INST aims to develop non invasive cancer therapy

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Efforts to make magnetic hyperthermia-mediated cancer therapy as desired therapy for inoperable tumours



Scientists from Institute of Nano Science & Technology (INST) in Mohali, have synthesised different magnetic nano-transducers like Stevioside-coated magnetite nanoparticles; Citric acid-coated Magnetic nanoclusters and Manganese and Zinc doped magnetite nanoparticles for successful application as magnetic hyperthermia agents for cancer therapy.

Dr Deepika Sharma and her team from INST have synthesized magnetic nanomaterials using a hydrothermal approach. They have also developed water-stable nanomaterial with a biomolecule as the surfactant to address two of the main concerns regarding the translation of nanotechnology-based strategies to clinical applications - biocompatibility of the material used and therapeutic response of these nanosystems.

The scientists have focused on the design and development of hyperthermia output and understanding the biological phenomena, which include their movement through biological barriers to fight against inoperable tumours.

The synthesized “nano-heaters” when subjected to magnetic hyperthermia either alone or in combination with other adjuvant therapy like photothermal therapy. This was then evaluated in terms of cell viability, oxidative stress production, reduction in mitochondrial membrane potential, cytoskeletal damage by confocal microscopy and morphological alterations by scanning electron microscopy in cancer cells and the results published in the ACS Applied Nanomaterials and Journal of Radiation and Cancer Research.

For the various nanosystems generated in their lab, INST team have achieved enhanced hyperthermia output with surface modifications of surfactant moieties and generating nanoclusters instead of conventional spherical nanoparticles. Such enhanced hyperthermia output makes it an efficient system to be used for Cancer therapy.