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IIT Mandi uses natural polymer-based smart nanoparticles to treat colorectal cancer

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Researchers develop biodegradable nanoparticles from renewable resources



Researchers at the Indian Institute of Technology (IIT) Mandi have used natural polymer-based smart nanoparticles to treat colorectal cancer. These nanoparticles release the drug in response to stimuli that are specific to the cancer site only.

The researchers have developed redox-responsive chitosan/stearic acid nanoparticles (CSSA NPs) as drug carriers for both curcumin (hydrophobic; a component from turmeric that is used daily in food) and doxorubicin (hydrophilic) drugs delivery targeting colorectal cancer. This approach of combining anticancer drugs having a different mode of anticancer action allows for the development of the systems for cancer therapy with enhanced efficacy.

The team has developed biodegradable nanoparticles from renewable resources, thus reducing the dependency on petroleum-based polymers. These smart nanoparticles are stable under physiological conditions and degrade at the tumour site in the presence of redox stimuli of cancer cells. These nanoparticles can be used to successfully load and release both hydrophilic and hydrophobic drugs having a different anticancer mechanisms which can help to improve the treatment efficiency.

Researchers have also investigated cancer cell killing efficiency through *in vitro* studies, and the colon targeting ability of the designed system through *in vivo* biodistribution experiments on c57bl/6j mice. The research team further plans to perform biological studies to gain deeper insight into the potential of the developed system for colorectal cancer treatment.