

IIT-Hyderabad develops combination therapy

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IIT Hyderabad. (File EPS)

HYDERABAD: A team of researchers from the Indian Institute of Technology (IIT)- Hyderabad have developed an effective combination therapy for cancer treatment, which combines the usually-used technique of chemotherapy with photothermal therapy (PTT).

The motive behind developing a combination of therapies was to come out with a technique to treat cancer with minimal or no side-effects at all, as the current approaches including surgery, chemotherapy and radiotherapy have adverse side-effects, said the researchers.

The treatment has been developed by researchers from the department of biomedical engineering, IIT-Hyderabad. For the combination therapy, the researchers used a naturally-derived anti-cancer agent called 'CfAC' that is extracted from the plant Anthocephalous Cadamba, which has shown efficacy in destroying cancer cells.

Dr Aravind Kumar Rengan, assistant professor, Department of Biomedical Engineering, who headed the research said, "In photothermal therapy, a material that converts light to heat is specifically sent to the tumour location, and when irradiated, causes ablation or destruction of the host cancer cells. IR780 is one such dye that absorbs near-infrared light and generates reactive oxygen species that kills the host cell. This dye is loaded onto a suitable carrier material and targeted at the cancer tissues," he added.

The researchers used liposomes - lipid nanoparticles a hundred thousand times smaller than the width of a single human hair - as the carriers for the IR780 because of their low toxicity, flexibility, biocompatibility, biodegradability and non-immunogenicity.

The team loaded liposomes not only with IR780 dye but also with CfAC.

These liposomes were tested against human breast cancer cells that were introduced into mice groups.

“We have demonstrated the synergistic and enhanced therapeutic benefits of combinational therapy against breast cancer with minimal/no adverse effects using biocompatible and biodegradable nanomaterials,” Dr Aravind said.

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