Desi scientist in US discovers molecule that illuminates cancer cells

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Indo-US scientist Sakkarapalayam Mahalingam, who is also an alumni of IIT-M, working at Purdue Centre for Drug Discovery in the United States | Express

CHENNAI: A desi scientist in the US, Sakkarapalayam M Mahalingam, an alumni of Indian Institute of Technology (IIT) Madras, has discovered a molecule that illuminates cancerous cells in the human body during surgery, allowing surgeons to have real time localisation of tumour nodules.

In an exclusive e-mail interview with Express ahead of World Cancer Day on Saturday, Mahalingam said, the molecule named OTL38 (optimal folate receptor targeted fluorescent dye conjugate) when injected in a cancer patient would bind specifically to targeted disease tissue within minutes. OTL38 is an illuminating, and innovative proprietary dye developed to attach with diseased cells, allowing the clinician to distinguish those from healthy cells. If successfully tested, this would provide surgeons with a way to visually enhance the identification of disease.

OTL38 has received orphan drug designation from the US Food and Drug Administration (FDA) and granted fast-track status to phase 3 clinical trials in humans.

He said for current cancer surgeries, surgeons must still rely primarily on aberrations in tissue morphology, coloration, or rigidity to distinguish malignant from healthy tissues.

While large tumour masses could be readily identified, small malignant lesions, boundaries between cancer and healthy tissues and buried malignant lymph nodes could not be reliably distinguished by such methodologies. “Our small molecules are very specific to targets over-expressed in diseased tissue, and can specifically introduce optical-imaging agents to diseased cells,” he explained.

When asked how reliable is the technology, Mahalingam said, during phase 2 trails, 96 per cent of the tissue that was illuminated in patients was confirmed by pathology to be cancerous, and 98 per cent of the malignant lesions identified by the surgeons brightly due to their uptake of the fluorescent dye.

“Up to 40% of cancers recur in the original site of the surgery because surgeons might missa microscopic cluster of 10 or 20 cells that cannot be seen during a normal procedure,” he said and added that the positive results of a phase 2 clinical study of the OTL38 molecule were important to gaining fast-track status from FDA.

The scientist said this technology was adaptable for all types of cancer surgeries.

The project was initiated in 2010 and in 2013 optical imaging agent OTL38 was invented for clinical use. OTL38’s phase 3 clinical trial for ovarian cancer were expected to commence this year.

“I worked on this project for 3 years and finally obtained OTL38 and successfully tested and validated using human cancers in animal models,” Mahalingam said.

The scientist said OTL38 was developed using cheaper near infrared (NIR) fluorophores that enable visualisation of tumour tissue even when buried within healthy tissue. It is way cheaper than other highly expensive commercially available near IR dyes. Further, patients need not worry about post-surgery expenses.