GETTY

TREATMENT

Lighting the way

The complete removal of tumours during surgery as part of cancer treatment is crucial as it affects patient survival. However, current criteria for delineating tumour margins are often subjective and difficult to quantify. The development of fluorescent probes to visualize tumours *in vivo* could therefore improve surgical outcomes.

Roger Tsien and colleagues used activatable cell-penetrating peptides conjugated to dendrimers (ACPPDs), which are composed of a fluorescently labelled cell-penetrating peptide coupled to a neutralizing peptide by a linker. The linker is cleaved by proteases that are present in tumour cells, allowing the fluorescent peptide to bind tumour cells. The authors showed that ACPPDs localize with tumour cells in mouse xenografts and transgenic models, and that these probes clearly delineated the margin between normal and tumour tissue. The surgical removal of ACPPD-labelled tumours resulted in a 90% reduction of residual cancer cells compared with standard unguided surgery. Moreover, mice that had tumours resected using ACPPD guidance showed improved tumour-free and overall survival.

ACPPDs can be used at different stages in the evaluation and treatment of cancer by dual labelling with a fluorescent marker and gadolinium. Unlike antibody-based approaches, ACPPDs do not rely on tumour biomarkers that are specific to certain cancer types and so they should be applicable to all tumour types.

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ORIGINAL RESEARCH PAPERS Olson, E. S. *et al.* Activatable cell penetrating peptides linked to nanoparticles as dual probes for *in vivo* fluorescence and MR imaging of proteases. *Proc. Natl Acad. Sci. USA* **107**, 4311–4316 (2010) | Nguyen, Q. T. *et al.* Surgery with molecular fluorescence imaging using activatable cell-penetrating peptides decreases residual cancer and improves survival. *Proc. Natl Acad. Sci. USA* **107**, 4317–4322 (2010)

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