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**[P005] Poster**

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# [P03-309] Prodrug-conjugated tumour-seeking commensals for targeted cancer therapy

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Conventional chemotherapy is limited by systemic toxicity, poor bioavailability, and low tumour specificity. Prodrugs improve selectivity through activation by tumour microenvironment (TME) cues, but their delivery remains imprecise. Here, we develop a bacteria-based delivery platform that harnesses tumour–microbiome interactions for targeted prodrug delivery. Using nasopharyngeal carcinoma (NPC) as a model, we identify *Lactobacillus plantarum* WCFS1 as a commensal strain with high-affinity binding to NPC cells. We engineer this strain to display streptavidin on its surface, enabling high-capacity loading of biotinylated prodrugs. A thioketal linker responsive to TME cues was conjugated to SN-38, a chemotherapeutic compound, to enable controlled drug release in the TME. Prodrug-loaded bacteria selectively bind NPC cells and locally release active SN-38, increasing cytotoxic potency up to 10-fold in vitro. In a C666-1 xenograft mouse model, systemic administration of prodrug-loaded bacteria resulted in tumour colonisation and significant tumour growth inhibition (67%) at reduced dosing, without observable toxicity. This work establishes a living, tumour-targeting delivery system that enables modular and site-specific activation of chemotherapeutics, with potential applications across diverse cancer types.