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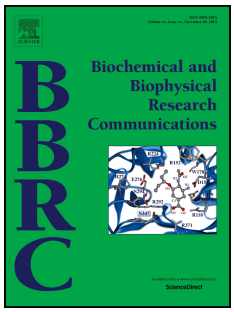

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In situ delivery and production system of trastuzumab scFv with *Bifidobacterium*

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Abstract

A monoclonal antibody targeting human epidermal growth factor receptor-2 (HER2), trastuzumab has become a standard treatment for HER2-positive breast cancer. Recent advancements in antibody engineering have enabled the efficient generation of the trastuzumab single-chain variable fragment (scFv).

In this study, we genetically engineered *Bifidobacterium*, a bacterial strain shown to accumulate safely and selectively in hypoxic tumor sites by intravenous (*iv*) injection, to express and secrete the trastuzumab scFv. The recombinant scFv bound to cell surface HER2 and inhibited *in vitro* growth of HER2-positive human cancer cells. Moreover, *iv*-injected recombinant bacteria specifically localized and secreted trastuzumab scFv in xenografted human HER2-positive tumors and consequently inhibited tumor growth.

The development and results of this novel *in situ* delivery and production system for trastuzumab scFv with *Bifidobacterium* represents a promising avenue for future application in cancer treatment.

Key words: *Bifidobacterium*, delivery, production, trasutuzumab-scFv, cancer-therapy