

# Accepted Manuscript

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PII: S0006-291X(17)31786-2

DOI: [10.1016/j.bbrc.2017.09.026](https://doi.org/10.1016/j.bbrc.2017.09.026)

Reference: YBBRC 38471

To appear in: *Biochemical and Biophysical Research Communications*

Received Date: 30 August 2017

Accepted Date: 6 September 2017

Please cite this article as: T. Kikuchi, H. Shimizu, Y. Akiyama, Shun'. Taniguchi, *In situ* delivery and production system of trastuzumab scFv with *Bifidobacterium*, *Biochemical and Biophysical Research Communications* (2017), doi: 10.1016/j.bbrc.2017.09.026.

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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, trastuzumab-scFv, cancer-therapy

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