Abstract

Cancer, a genetic disease symbolized by uncontrollable cell proliferation, has been one of the most common death causes in the world. The most prevalent therapies to treat cancer patients, including surgery, radiation, and chemotherapy, still have limitations such as inability to combat metastatic stage, uneven tissue penetration, and cytotoxicity issues. Hence safe targeted therapy strategy is needed to improve these conventional cancer treatment methods. Bacteria can be one of the promising candidates for safe and effective anticancer agents since bacteria can be engineered to be small programmable robots that are selectively cytotoxic to cancer cells. Moreover, several natural types of bacteria are proved to be able to preferentially colonize in tumor tissue after injection, possibly due to hypoxic conditions of the tissue.

Previously, studies about bacteria as anticancer agents have mainly focused on attenuated pathogenic bacteria. Due to safety concern, probiotic bacteria have gained more attention as candidates for safer anticancer agent. In this project, we aim to enhance the safety and effectiveness of the bacterial-based targeted cancer treatment by engineering probiotic bacteria to express specific anticancer protein controllably so that these engineered bacteria can further express the protein and induce specific apoptosis to cancer cells effectively in vivo.

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