

An engineered probiotic for colorectal cancer therapy modulates the gut microbiota

Yusook Chung
Yongku Ryu
Byung Chull An
Yeo-Sang Yoon
Oksik Choi
Tai Yeub Kim
Jae Kyung Yoon
Jun Young Ahn
Ho Jin Park
Soon-Kyeong Kwon
Jihyun F. Kim
Myung Jun Chung

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Abstract

Colorectal cancer is an aggressive disease that kills almost 900,000 people each year, but chemotherapy, a common treatment, has toxic side effects and can induce resistance, resulting in treatment failure and relapse. One alternative is to use bacteria to fight cancer directly or to deliver drugs to target tissues. However, many of the bacteria tested so far are pathogenic and therefore carry risks of infection. In a recent study, researchers created an engineered probiotic to treat colorectal cancer orally. They isolated the nontoxic lactic acid bacterium *Pediococcus pentosaceus* from the Korean food, kimchi, and programmed it to carry P8, a previously identified candidate protein for colorectal cancer treatment. In a mouse colorectal cancer model established with human cancer cells, the engineered probiotic, PP^{*}-P8, limited tumor sizes and growth rates. Furthermore, in mice with chemical-induced colitis-associated cancer, the probiotic caused polyp regression and ameliorated gut microbiota disruption. Notably, the engineered probiotic increased the abundance of *Akkermansia*, which is associated with a healthy microbiome, and decreased that of *Turicibacter*, which is associated with pathologies. Although further research is needed to elucidate the mechanisms, the engineered probiotic is a promising treatment for colorectal cancer and related microbiome imbalance.