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Harnessing Lactobacillus reuteri-Derived Extracellular Vesicles for Multifaceted Cancer Treatment

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Abstract

Extracellular vesicles (EVs) have emerged as valuable biological materials for treating intractable diseases. Extensive studies are conducted on EVs derived from various cellular sources. In this study, EVs derived from *Lactobacillus reuteri* (L. reuteri), a probiotic, exhibit remarkable cancer therapeutic efficacy when administered orally is reported. These L. reuteri-derived EVs (REVs) demonstrate stability in the gastrointestinal tract and exert significant anti-tumor effects. Using A549 cells and murine models, we confirmed that REVs mediate their therapeutic effects by modulating apoptotic signaling pathways. Furthermore, the combination of REV with drugs enhances tumor ablation and induces immunogenic cell death. In a mouse model, oral administration of REVs encapsulating indocyanine green followed by photothermal therapy led to complete tumor elimination within 32 days. REVs represent a promising biological therapeutic platform for cancer treatment, either independently or in combination with other therapies, depending on the treatment objectives.

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