

# Ameliorative Effects of Plant-Derived Extracellular Vesicles on Intestinal Diseases

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## Outline

- I. Introduction
- II. peu-MIR2916-p3-enriched garlic exosomes ameliorate murine colitis by reshaping gut microbiota, especially by boosting the anti-colitic *Bacteroides thetaiotaomicron*
- III. Macromolecules with predominant  $\beta$ -pleated sheet proteins in extracellular vesicles released from *Raphanus sativus* L. var. *caudatus* Alef microgreens induce DNA damage-mediated apoptosis in HCT116 colon cancer cells
- IV. Conclusion

## Abstract

Inflammatory bowel disease (IBD) and colorectal cancer (CRC) are major intestinal disorders, yet current therapies often cause adverse effects and show limited efficacy, highlighting the need for novel adjunctive strategies. This study investigated the therapeutic potential of plant-derived extracellular vesicles (EVs) in intestinal diseases. Garlic-derived EVs (GELNs), enriched with peu-MIR2916-p3, were found to modulate gut microbiota, particularly by promoting the growth of *Bacteroides thetaiotaomicron*, thereby alleviating DSS-induced colitis and restoring intestinal barrier function in mice. Meanwhile, EVs derived from *Raphanus sativus* L. var. *caudatus* Alef, characterized by  $\beta$ -sheet-rich macromolecular proteins, induced DNA damage and apoptosis in HCT116 colorectal cancer cells while exhibiting lower cytotoxicity toward normal cells compared with cisplatin. Collectively, these findings suggest that plant-derived EVs possess significant potential as complementary therapeutic strategies for IBD and CRC, offering novel avenues for clinical applications.

- Kaimuangpak, K., Rosalina, R., Thumanu, K., & Weerapreeyakul, N. (2024). Macromolecules with predominant  $\beta$ -pleated sheet proteins in extracellular vesicles released from *Raphanus sativus* L. var. *caudatus* Alef microgreens induce DNA damage-mediated apoptosis in HCT116 colon cancer cells. *International Journal of Biological Macromolecules*, 269, 132001.
- Wang, X., Liu, Y., Dong, X., Duan, T., Wang, C., Wang, L., & Li, T. (2024). peu-MIR2916-p3-enriched garlic exosomes ameliorate murine colitis by reshaping gut microbiota, especially by boosting the anti-colitic *Bacteroides thetaiotaomicron*. *Pharmacological Research*, 200, 107071.