Abstract

Colorectal cancer (CRC) remains a global health burden, with treatment limitations due to toxicities. Plant nanovesicles (PDNV) have attracted attention due to their stability, bioavailability, and anticancer potential. Taro is a promising source for PDNV due to its bioactive compounds that could have anticancer effects. However, taro-derived nanovesicles (TDNV) anticancer potential remains underexplored. This study evaluated the TDNV purification method, and its effect on CRC cells. Samples were purified using size exclusion chromatography (SEC) and ultracentrifugation, characterized by DLS, TEM, and BCA assay and tested on CRC cell viability and migration rate. Ultracentrifugation method showed a higher vesicle recovery than SEC, with protein concentration of 2.41 ± 0.79 mg/mL. The TDNV has a spherical morphology with a concentration of 2.75×10^{12} particles/mL, primary size of 199.2 ± 16.7 nm, and a zeta potential of −20.7 ± 0.40 mV, confirming a colloidally stable nanovesicle structure. However, the particle protein ratio suggested low sample purity. Treatment with 250 µg/mL TDNV significantly reduced cell viability to 50.3% after 12 hours ($p = 0.0174$). However, the inhibitory effect diminished at 24 and 48 hours. TDNV also significantly suppressed cell migration at 100 µg/mL and 250 µg/mL, resulting in a slower wound closure rate at 12% and 33% after 24 and 48 hours ($p = 0.0488$). These findings suggest that ultracentrifugation has better vesicle recovery than SEC, and TDNV may modulate CRC viability and migration. Purification optimization and molecular analysis is needed to enhance the TDNV purity, and understand the underlying mechanism.

Keywords: *Colorectal cancer, extraction, viability, migration, taro-derived nanovesicles*