

10TH ASIA-PACIFIC PHARMA CONGRESS

May 08-10, 2017 Singapore

Mechanistic study of phlorofucofuroeckol A for the induction of apoptosis in human colorectal cancer cells

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Phlorofucofuroeckol A (PFF-A) as one of the phlorotannins found in the brown algae has been reported to exert anti-cancer property. However, the molecular mechanism for anti-cancer effect of PFF-A has not been known. Activating transcription factor 3 (ATF3) has been reported to be associated with apoptosis in colorectal cancer. The present study was performed to investigate the molecular mechanism by which PFF-A stimulates ATF3 expression and apoptosis in human colorectal cancer cells. PFF-A decreased the cell viability through an apoptosis in human colorectal cancer cells. PFF-A increased ATF3 expression through regulating transcriptional activity. The responsible cis-element for ATF3 transcriptional activation by PFF-A was CREB located between -147 to -85 of ATF3 promoter. Inhibitions of p38, JNK, GSK3 β and I κ K- α blocked PFF-A-mediated ATF3 expression. ATF3 knockdown by ATF3 siRNA attenuated the cleavage of PARP by PFF-A, while ATF3 overexpression increased PFF-A-mediated cleaved PARP. These results suggest that PFF-A may exert anti-cancer property through inducing apoptosis through ATF3-mediated pathway in human colorectal cancer cells.

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