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Proteomic identification revealed Anticancer mechanism of Antimicrobial peptide GW-Q4a and its combination with chemotherapeutic drugs against colorectal cancer cell line HCT116

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A ccording to the annual report from the Ministry of Health and Welfare, the prevalence and incidence rate of colon cancer in Taiwan increased year by year. Previous studies revealed that antimicrobial peptides (AMPs), also known as host defense peptides (HDPs), possess antibacterial, anticancer, and immune regulation effects. In our previous works, our self-designed novel AMPs showed potent anticancer activities against liver, prostate, lung adenocarcinoma, gastric and colorectal cancer cell lines. And they resulted in various cytotoxic mechanisms including apoptosis, autophagy and necrosis pathways. In the current study, we identified the anticancer mechanism of AMP GW-Q4a against colorectal cancer cell line HCT116 via proteomic approaches. The results demonstrated that it's related to the down-regulation of stathmin (also called oncoprotein 18), calpain small subunit 1 (Capn4), translationally-controlled tumor protein (TCTP), protein canopy homolog 2 (CNPY2), Warburg effect-related glycolysis enzymes (such as L-lactate dehydrogenase, triosephosphate isomerase, isocitrate dehydrogenase and transaldolase) and up-regulation of 60 kDa heat shock protein (HSP60). Moreover, in order to reduce the drug resistance, side effects and drug dose, we tried to combine AMPs with chemotherapeutic drugs (e.g., 5-FU, Leucovorin and Oxaliplatin) and evaluate their synergistic effect against HCT116 cell line. Our preliminary results revealed that GW-Q4a and 5-FU showed promising synergy at dosage of GW-Q4a (2.26 μ M) and 5-FU (9.05 μ M) with combination index (CI) of 0.38. According to our findings in this study, we may provide support for future application of GW-Q4a and its combination with chemotherapeutic drugs as potential anticancer agents for colorectal cancer treatment.

Biography

Eden Wu has completed her Bachelor's degree from Department of Biotechnology and Animal Science, National Ilan University, Taiwan. She is currently studying Master's program in the same department, and is estimated to obtain her Master's degree this July.

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