



Effects of Mitragynine on Aggressive Behaviors of Cholangiocarcinoma Cells

Jiranon Lueangwiroj, Sorawit Sawisai

Demonstration School of Khon Kaen University, Secondary Level (Faculty of Education)

Supervisor: Charupong Saengboonmee, Kwanjai Kanokmedhahul

Email: charusa@kku.ac.th

Cancer is the second leading cause of death worldwide. There is a particular type of cancer with the highest global incidence in the Northeast of Thailand, which is a bile duct cancer or cholangiocarcinoma (CCA). Most patients with CCA present with the advanced stage because early diagnosis is lacking. The standard chemotherapy: gemcitabine and cisplatin, are the only present choices for CCA treatment. The median overall survival of patients treated with chemotherapy is less than a year. The target therapy is unavailable. So the treatment strategies for CCA need to be improved. This study then aimed to investigate the effects of mitragynine: a natural compound from *Mitragyna speciosa* Korth (Kratom) on cell proliferation and migration of CCA. Two CCA cell lines: KKU-055 and KKU-213A, were selected to examine the anti-proliferative and anti-migratory effects of mitragynine by the MTT assay and wound healing assay, respectively. Both cell lines were treated with 0, 6.25, 12.5, 25, 50 and 100 μM of mitragynine for 72 h, then 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) was added and OD540 nm was measured after 4 h incubation to determine the effects of mitragynine on CCA cell proliferation. Mitragynine suppressed the growth of CCA cells dose-dependently in both cell lines. The IC_{50} (concentration that inhibits cell growth by 50%) of KKU-055 is 32.45 μM and KKU-213A is 22.90 μM . Effects of mitragynine on migration of CCA cells were examined in both cell lines after treatment with a non-lethal concentration of 12.5 μM mitragynine. Mitragynine exerted anti-migratory effects on CCA cells compared with the vehicle control at 24 h for KKU-055, and at 12 h for KKU-213A. This study reported for the first time that mitragynine can suppress aggressive behaviors of CCA cells; namely, cell proliferation and cell migration. The mechanisms underlying the anti-tumor effects of mitragynine need to be further explored. In conclusion, mitragynine possesses anti-tumor effects on CCA and is a promising compound that should be further study for the improvement of CCA treatment.

Keywords: Cholangiocarcinoma, Mitragynine, Cell Proliferation, Cell Migration