Anticancer activity of grassy Hystrix brachyura bezoar and its mechanisms of action: An in vitro and in vivo based study


Abstract

Percupine bezoar (PB) is a calcium undigested material generally found in porcupine's (Hystrice brachyura) gastrointestinal tract. The bezoar is traditionally used in South East Asia and Europe for the treatment of cancer. This paper presents the first report on in vitro A375 cell viability assay, apoptosis assay, cell cycle arrest assay, migration assay, invasion assay, qPCR experimental assay and in vivo anti-angiogenesis assay using the grassy PB. Experimental findings revealed IC50 value are 26.59 +/- 1.37 mu g/mL and 30.12 +/- 3.25 mu g/mL for PB-A and PB-B respectively. PBs showed anti-proliferative activity with no significant cytotoxic effect on normal human dermal fibroblast (NHDF). PBs were also found to induce apoptosis via intrinsic pathway and arrest cell cycle at G2/M phase. Additionally, the findings indicated its ability to destabilize migration and invasion of A375 cells. Further evaluation using embryonic zebrafish model revealed LC50 = 450.0 +/- 250.0 mu g/mL and 58.7 +/- 5.0 mu g/mL for PB-A and PB-B which also exerted anti-angiogenic effect in zebrafish. Moreover, stearic acid, uronosylcholic acid and pregnenolone were identified as possible metabolites that might contribute to the anticancer effect of the both PBs. Overall, this study demonstrated that PB-A and PB-B possess potential in vitro and in vivo anticancer effects which are elicited through selective cytotoxic effect, induction of apoptosis, inhibition of migration and invasion and anti-angiogenesis. This study provides scientific evidence that the percupine bezoar does possess anti-cancer efficacy and further justifies its traditional utility. However, more experiments with higher vertebrate models are still warranted to validate its traditional claims as an anticancer agent.

Keywords

Percupine bezoar, Apoptosis, Cell cycle arrest, Anti-angiogenesis, Anti-metastasis

Key Words Plus: STEARIC ACID, INDUCE APOPTOSIS, PALMITIC ACID, CELL-CYCLE, CANCER; MELANOMA; ANTIDOTE; TARGETS; STONES; ESTER

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