Determining the Active Compound in Achyranthes aspera Leaf Extract and Its Effects on the Cell Cycle and Growth of Pancreatic Cancer Cells

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Achyranthes aspera is a plant found commonly in parts of India and has been anecdotally noted to improve the prognosis of pancreatic cancer patients. Because 91% of newly diagnosed pancreatic cancer patients will die of it within the year, it is imperative to discover new drugs to help combat pancreatic cancer. The purpose of this experiment is to isolate an active compound from Achyranthes aspera leaf extract and discover its effects on the cell cycle of pancreatic cancer cells and growth of pancreatic cancer cells. The hypothesis is: if pancreatic cancer cells are treated with Achyranthes aspera active compound, then their cell cycles will be disrupted at the G1 checkpoint and the cells will undergo apoptosis. First, the active compound was isolated using Sephadex LH-20 liquid chromatography and an HPLC column. Then to test the hypothesis, Flow Cytometry analysis and cytotoxicity assays were performed. The results of these assays show the active compound isolated from Achyranthes aspera disrupted the cell cycle between the S and G2/M phases, thus disproving the hypothesis. Additionally, the cytotoxicity assays show the active compound induces apoptosis in pancreatic cancer cells with increasing concentrations of the isolated active compound. These results are significant because one drug commonly used to treat pancreatic cancer, Gemzar, halts the cell cycle at the G1 checkpoint. However, it also produces many deleterious effects such as the sloughing off of cells in the GI tract and death of hair follicle cells. If Achyranthes aspera active compound can halt the cell cycle of pancreatic cancer cells at the G2 checkpoint without harming a patient's healthy cells, it may prove a more effective treatment for pancreatic cancer.

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